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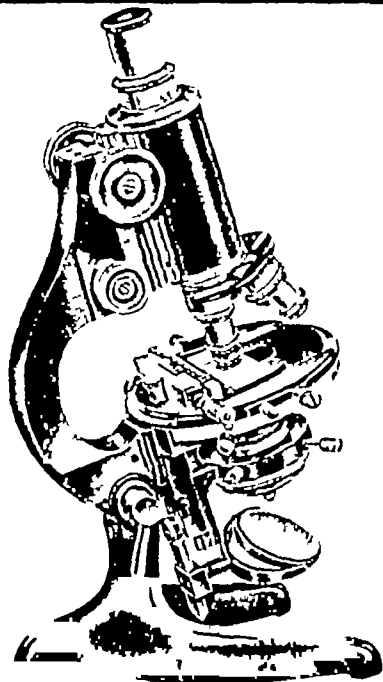
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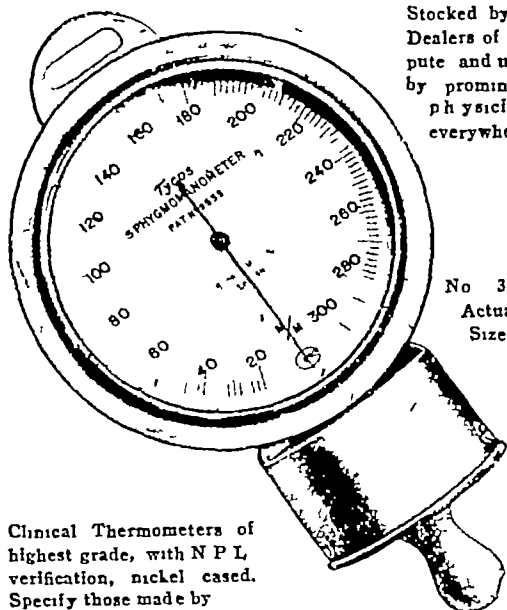
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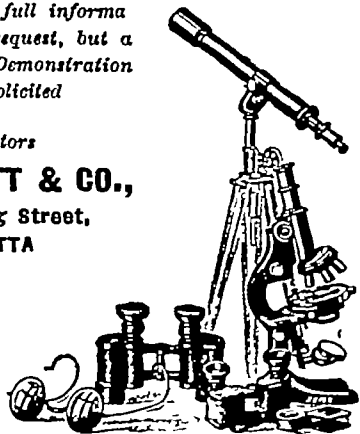
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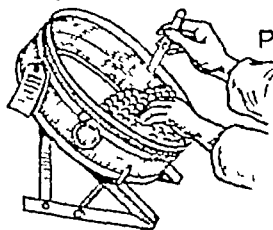
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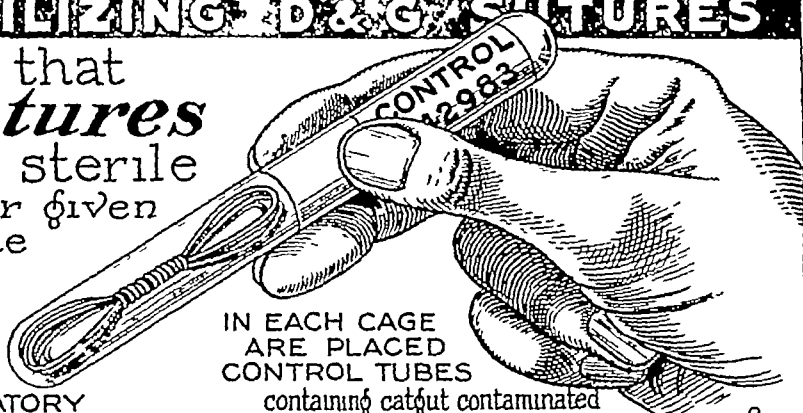
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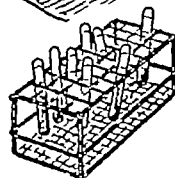


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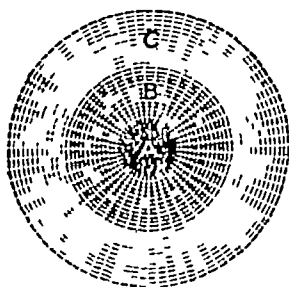
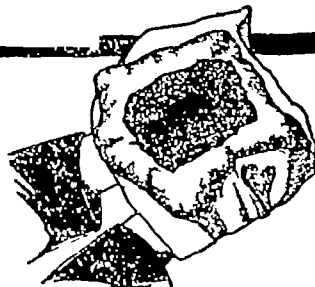
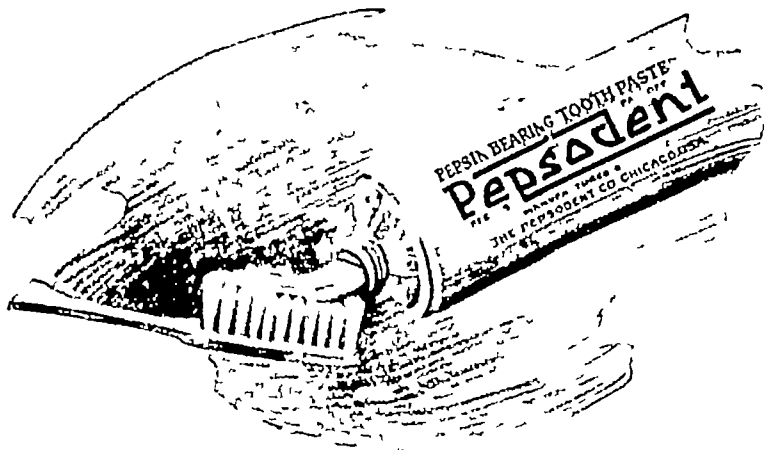


Diagram represents inflamed area. In zone "C" blood is flowing freely through underlying vessels. This forms a current away from the Antiphlogistine, whose liquid contents, therefore, follow the line of least resistance and enter the circulation through the physical process of endosmosis. In zone "A" there is stasis, no current tending to overcome Antiphlogistine's hygroscopic property. The line of least resistance for the liquid exudate is therefore, in the direction of the Antiphlogistine. In obedience to the same law exosmosis is going on in this zone, and the excess of moisture is thus accounted for.



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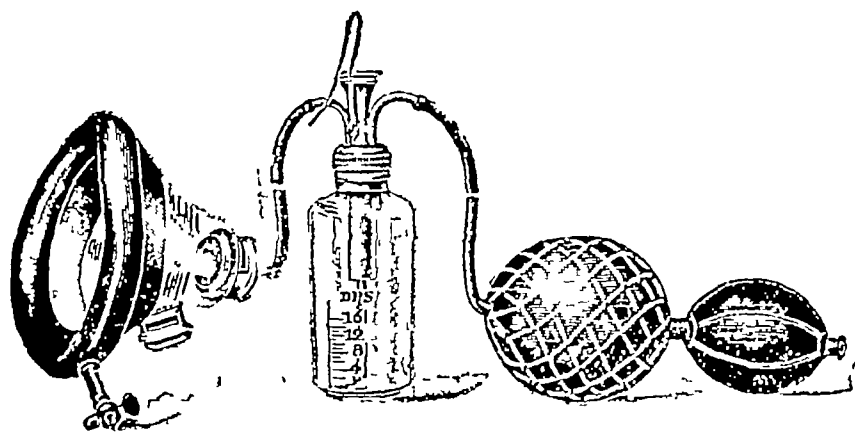
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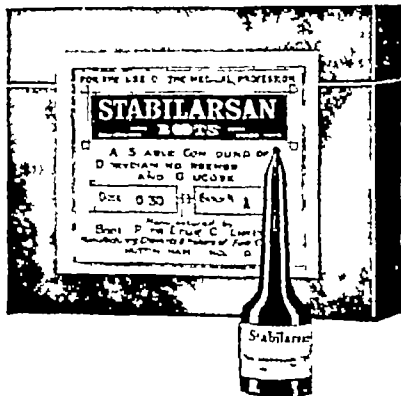
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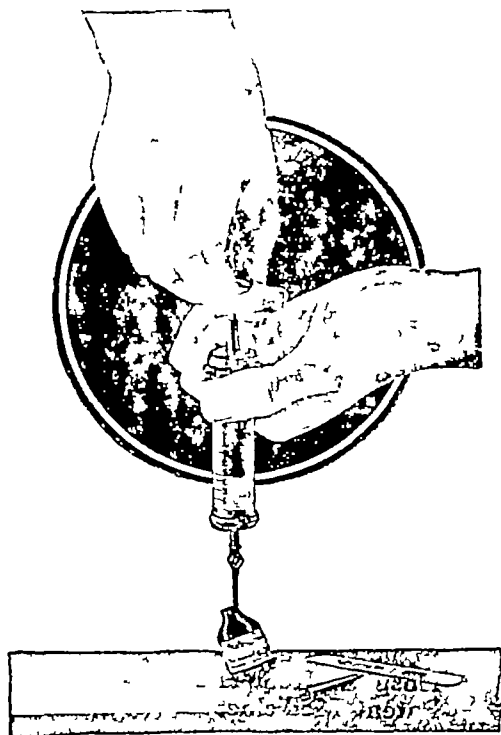
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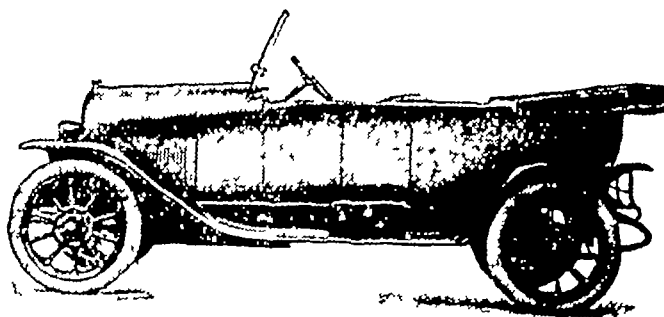
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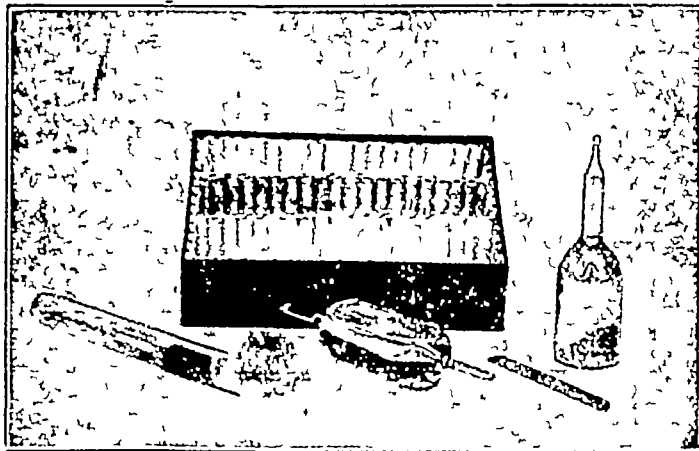


Fig 1

## THE OUTFIT (Fig 1)

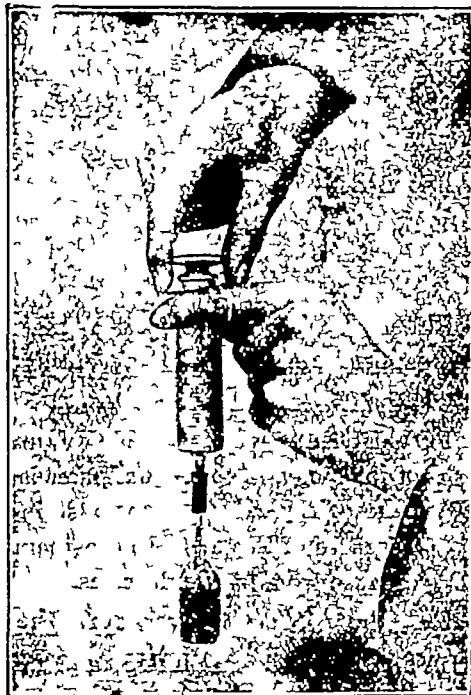
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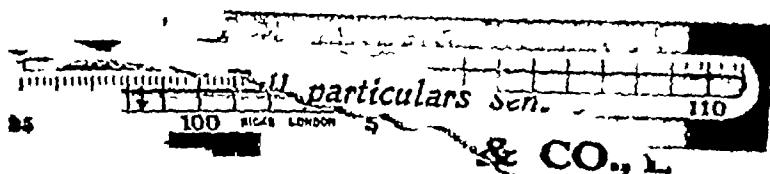
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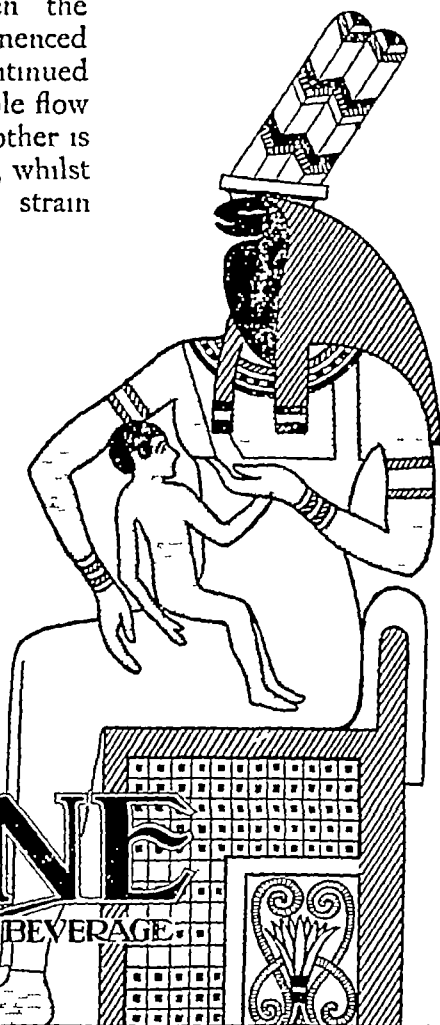
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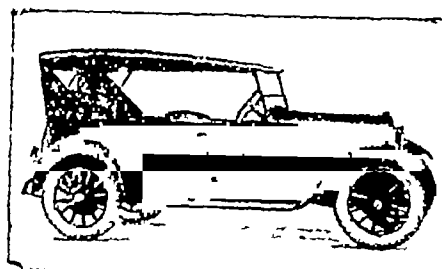
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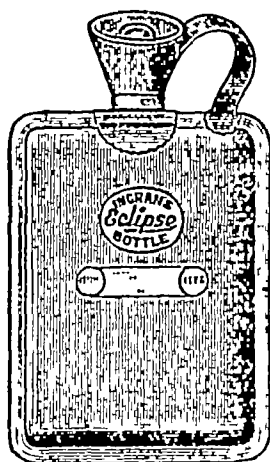
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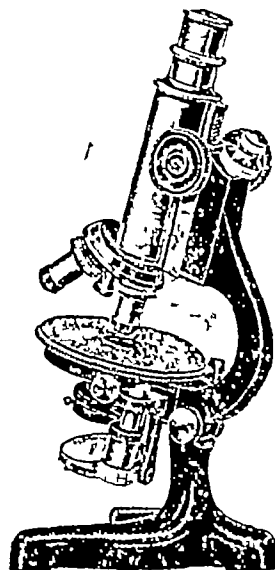
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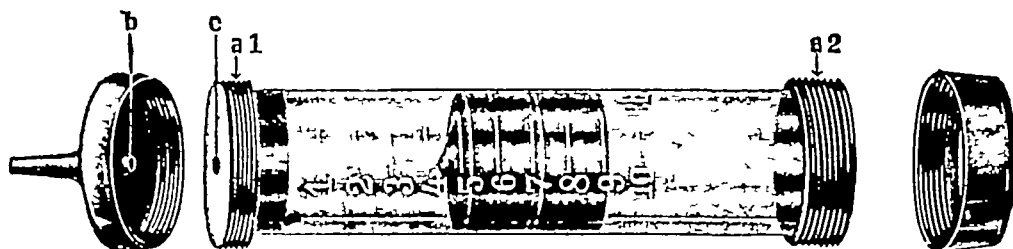
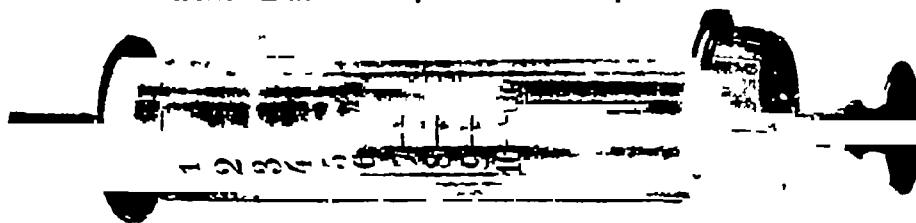
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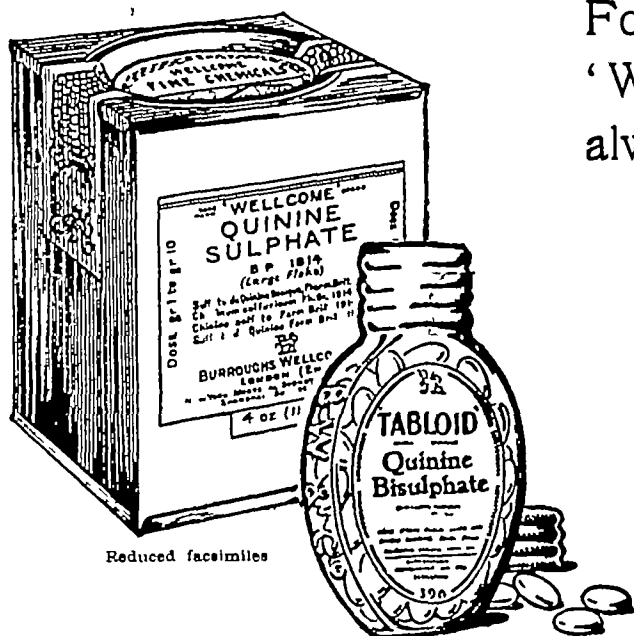
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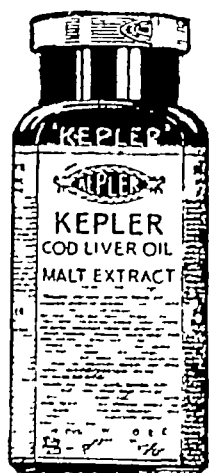
  
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## Original Articles.

### AN OUTBREAK OF THE EPIDEMIC DROPSY FORM OF BERIBERI IN CALCUTTA

By J W D MEGAW,

LIEUT COLONEL, I.M.S.,

*Professor of Tropical Medicine and Director Calcutta School of Tropical Medicine*

and

Dr S P BHATTACHARJEE, M.D.

*Assistant Professor of Tropical Medicine Calcutta School of Tropical Medicine*

THIS outbreak was brought to our notice by Major Harnett I.M.S. Superintendent of the Campbell Medical School, who informed us that epidemic dropsy had broken out among the lady students of the School. The cases were seen by both of us, but the detailed investigation was made almost entirely by the junior author assisted by Dr S K. Banerji, Khanna research scholar in beriberi at the Calcutta School of Tropical Medicine. The source of the rice supplied to the lady students was first investigated and it was found that seven out of the nine members of the family of the dealer who supplied the rice were suffering from the same disease, one of them being very severely affected. Several other persons in the locality of the rice dealer's shop were also affected. The rice supply of these came from the same intermediate dealer who supplied the small dealer whose family was affected. Attempts were made to trace the rice to its original source but without success. Several other groups of cases were brought to our notice. Their distribution in time and place is shown in the accompanying map. The various groups are (a) Campbell Medical School—lady students (b) Kala Bagan—Hindu working classes (c) Parsi bazaar—Mahomedan working classes (d) Satyapir bazaar and Mya bazaar—Mahomedan working classes (e) Motizil—Mahomedan working classes (f) Eastern Bengal Railway quarters—Anglo-Indian railway employees who were comfortably off.

Altogether seventy cases were observed, and although it is quite possible that other cases may have occurred in Calcutta, it is not likely that these were numerous as wide publicity was given to the outbreak, and the medical officers of health of Calcutta as well as the private practitioners of the city were on the look out for cases of the disease.

The special feature of the outbreak was the occurrence of small groups of cases in certain limited areas, all of which were situated

in one quarter of the city. Most of the groups of cases appeared almost simultaneously and without any obvious connection with each other. The dates of onset are recorded from the reports of the patients themselves, they are only approximately accurate, but the margin of error cannot be great as the enquiries were made within three weeks of the onset of the disease.

Those who were under control, viz., those in group (a) were examined on several occasions and showed the following symptoms and signs.

*Fever*—Intermittent slight fever which rises in the evening up to 99° F or 100° F was actually present at the time of examination in 13 out of 23 patients. One showed higher rises up to 103° F, but malaria co-existed as a complication. The duration of the fever was two to six weeks in the febrile cases.

*Knee jerks*—These were very variable and repeated examinations by different observers were made. At one examination there might be a loss of jerks at another examination, even on the following day, the jerks might be present though every precaution was taken to avoid errors of observation. The following is the result of repeated examinations.

Normal	8/23
Increased	6/23
Diminished	5/23
Lost	4/23

#### *Gastro-intestinal System*

Vomiting	2/23
Loss of appetite	20/23
Diarrhoea	11/23

*Cardio-vascular System*—Præcordial pain and palpitation were present in 7 out of 23 cases and a short systolic bruit at the apex in 9 cases. There was no evidence of cardiac dilatation, the apex beat being in normal position in all.

The blood pressure of the patients taken in the second or third week of the disease ranged from—

(1) Systolic 110 to 145 mm Hg, the average being 123.2 mm Hg.

(2) Diastolic 65 to 80 mm Hg, average average being 80 mm Hg.

(3) Pulse pressure 43.2 mm Hg.

In a series of eighteen controls who were selected from people of the same age, sex, race and habits as far as possible, the pressures were—

(1) Systolic 108 to 122 mm Hg, the average being 116.3 mm Hg.

(2) Diastolic 65 to 80 mm Hg average being 74.2 mm Hg.

(3) Pulse pressure 42.1 mm Hg.

The blood pressure was estimated by the auscultation method and by the same instrument in all the cases.



The patients of this series were carefully observed. They improved rapidly on a modified diet from which rice was excluded in some cases. Those who continued to take rice obtained it from a different source and in smaller quantities. Three months later they were examined, palpitation and weakness were present in most of them. The knee jerks were still absent in one, but there was no other evidence of neuritis. The other groups showed similar symptoms. Only two deaths were reported, these occurred in untreated cases. The blood pressure observations are recorded in the accompanying Table I. It is interesting to note that the systolic blood pressure

There is no evidence that deficiency was an important factor in connection with the disease. The protein intake of one group is low but not much lower than that of the controls, and on the other hand the proteins of the Anglo-Indian patients were not only high but were largely of animal origin and so were exceptionally "available." There was no observable defect in any vitamin and so far as we know there is no case on record in which a definite association has been shown to exist between the occurrence of epidemic dropsy on a large scale and vitamin deficiency in the diet.

TABLE I

No	AFFECTED							NON-AFFECTED CONTROLS				
	Race	Age	Day of disease 10-9 23	Systolic pressure in mm Hg	Diastolic pressure in mm Hg	Three months and 10 days after systolic pressure 20-12 23	Diastolic pressure	Race	Age	General condition	Systolic pressure	Diastolic pressure
1	Assamese	23	15th	110	75	112	82	Up-country	23	Good	116	78
2	Bengalee	21	14th	130	80	108	75	Bengalee	20	Do	115	75
3	Assamese	21	20th	120	75	120	70	Do	22	Fair	112	75
4	Bengalee	19	15th	112	65	110	70	Do	19	Good	115	70
5	Do	19	15th	140	100	126	88	Do	20	Do	118	78
6	Do	20	15th	130	78	115	75	Do	22	Fair	116	80
7	Do	25	21st	130	90	110	75	Do	18	Good	108	78
8	Do	20	9th	110	70	125	75	Do	18	Do	118	75
9	Do	22	12th	100	70	112	72	Do	23	Fair	110	65
10	Do	19	14th	125	75	105	55	Do	20	Do	120	82
11	Do	25	10th	110	80	118	78	Do	26	Good	115	78
12	Do	17	17th	125	85	100	65	Do	16	Do	114	70
13	Do	22	15th	110	80	105	75	—	—	—	—	—
14	Do	19	21st	145	95	112	80	—	—	—	—	—
15	Do	19	12th	145	80	108	68	—	—	—	—	—
16	Do	45	10th	130	80	114	68	Bengalee	48	Good	118	78
17	Hindustani	50	5th	108	70	122	70	Hindustani	52	Do	122	80
18	Bengalee	35	16th	112	72	110	70	Bengalee	30	Do	110	68
19	Do	21	14th	125	75	108	65	Do	22	Do	108	65
20	Do	18	17th	135	90	112	68	Do	20	Fair	116	72
21	Do	20	18th	140	92	114	70	—	—	—	—	—
22	Do	25	19th	132	100	110	75	—	—	—	—	—
23	Do	28	20th	110	65	115	80	Bengalee	26	Good	108	65
Average				123.2	80	112.6	73.4				116.3	74.2

ranged from 100 to 126 mm Hg, the average being 112.6, the diastolic from 55 to 88 mm Hg, the average being 73.4 the pulse pressure being 39.2.

There is evidence that the blood pressure is usually raised during the early stages of the disease.

The diets of the affected groups were carefully enquired into and the results are shown in Table II. For the purpose of comparison control groups were selected and their diets were enquired into. The control groups were, as nearly as possible, similar in age, sex, condition and habits to the affected groups.

There is a possible association with stored rice. The distribution of the cases in time and place suggests a food intoxication rather than an infection. The one common article of food which is likely to be responsible is rice so that special enquiries were made as to the source of the rice. It came from the local rice mills and was of the "parboiled" variety. The rice used by the patients of three groups (a, b, and c) had been stored for at least a year after manufacture. The rice used by people of the other groups could not be traced to its source, but so far as could be ascertained it had probably been stored for

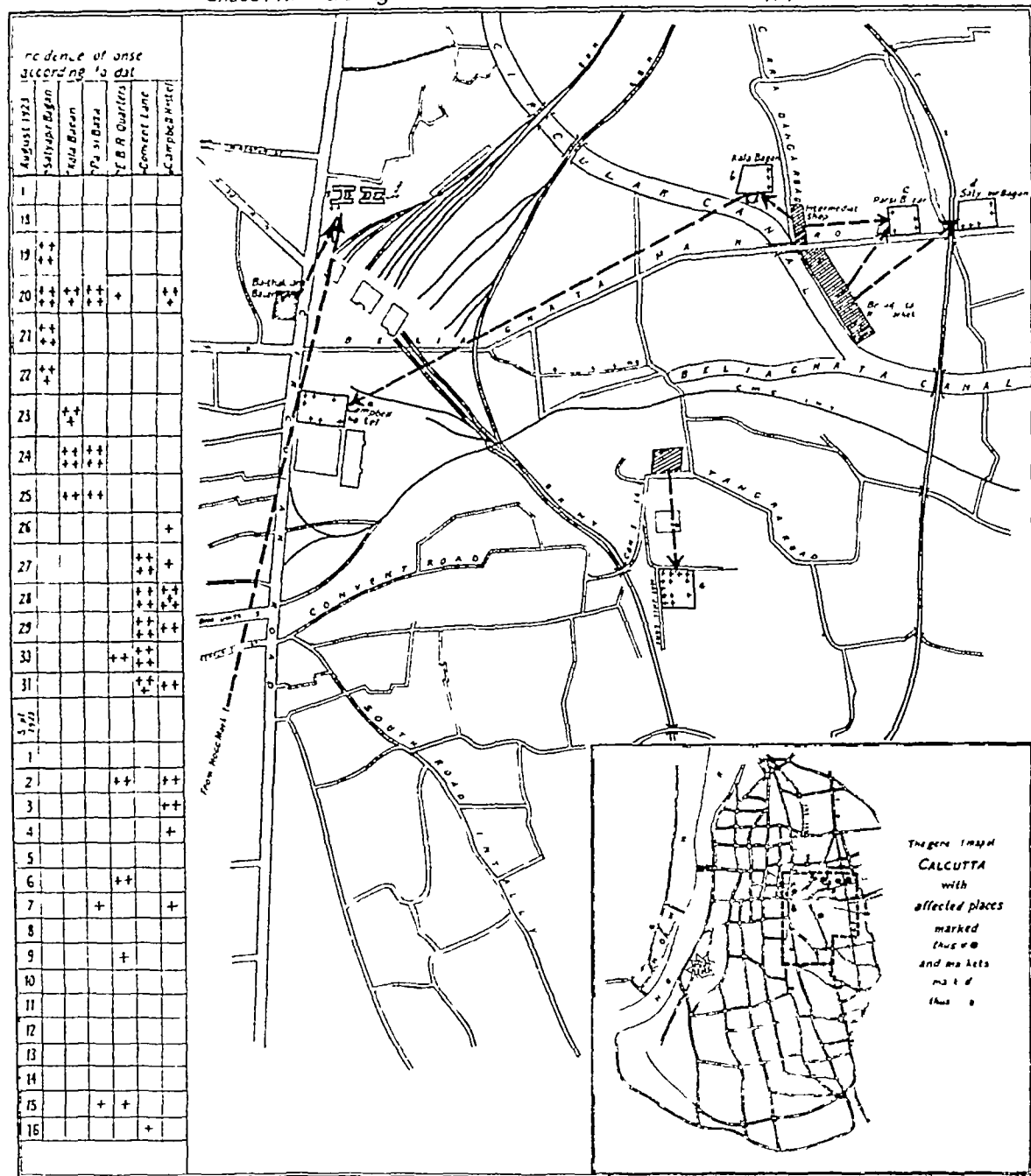
about the same period viz, about six months in the rice mill store house, about three months in the intermediate dealer's shop, and about three months in the small dealer's shop

The immediate source of the rice supply of the affected persons, is shown in the map. The arrow in each case extends from the

the outbreak was traced definitely to this market, the rest may very well have come from the same place, but it was not possible to trace it further than the small dealer's shop

Although the problem of beriberi in the Far East does not directly concern us, it is

CALCUTTA—showing area affected and sources of rice supply



shop from which the rice was bought to the houses of the patients. If the disease was caused by poisoned rice it is likely that one particular sample was affected and that this came from the large rice market in Beha-gatha. Some of the rice in use at the time of

the outbreak was traced definitely to this market, the rest may very well have come from the same place, but it was not possible to trace it further than the small dealer's shop. Although the problem of beriberi in the Far East does not directly concern us, it is

closely bound up with that of epidemic dropsy, in fact, it is likely to be essentially the same. For this reason it is necessary to follow the work that is being done by investigators in the Malay States on the subject of beriberi. In a paper read at the Fifth Congress of the

Far Eastern Association of Tropical Medicine in September, 1923, Dr A T Stanton discussed the rival views on beriberi. He dismissed the infection theory as being unsupported by any evidence which was not capable of an alternative explanation, and he then went on to discuss the food poisoning theory. So that there may be no misconception of his statement, we reproduce it in his own words—

"The resemblances between beriberi and other forms of polyneuritis, such as those due to alcohol and arsenic, early led to the formulation of theories postulating the existence of a poison in food. One of these theories, that of a poison in rice, was elaborated by Braddon in a masterly study of the epidemiology of beriberi. He conjectured that the growth of some mould or germ in or on 'uncured rice' was the source of a toxin, which when ingested, produced the symptoms.

There is abundant evidence from animal experiments that negatives this view. Such is the evidence derived from the results of feeding two groups of fowls on *paddy*: fowls fed on untreated *paddy* remain healthy, while fowls fed on the same *paddy* after heating in an autoclave invariably develop polyneuritis. Upholders of the food poisoning theory, however, reject the claim that the polyneuritis of fowls is identical with human beriberi. I, therefore, bring forward the following evidence, not hitherto published, which relates to observations on human beriberi.

In the last quarter of 1917 there occurred in the Singapore Criminal Prison a number of cases recorded as 'nephritis and cedema,' 34 cases with 5 deaths. In the month of January, 1918, there were 49 cases with 8 deaths. As parboiled rice was the staple of the prison diet, the possibility of beriberi was not at first considered or if considered was rejected. Towards the end of January, 1918, an enquiry was instituted by Dr F B Croucher and Dr G A Finlayson, who reported that of 73 patients in the prison hospital on the 20th January, 1918, 21 were suffering from beriberi and of these 18 had developed the disease in the prison. In seeking for an explanation of what was then a rare association, that of parboiled rice with beriberi, it was learned that the rice was being cooked by steam under high pressure and to this fault the outbreak was ascribed. By this procedure the time for cooking was shortened by about an hour. The practice of cooking the rice by ordinary steaming was resumed, no other change being made, and thereafter the outbreak of beriberi subsided. In the second quarter of 1918, no case of beriberi was recorded in the prison.

In 1911 I carried out experiments with

undermilled (parboiled) rice cooked by steam under pressure at the District Hospital, Kuala Lumpur. Six fowls, of an average weight of 1,160 grammes, were fed on the rice supplied to the patients in the hospital, in three weeks two fowls had developed polyneuritis and the loss of weight in the whole group was 26 per cent. Six other fowls of an average weight of 1,170 grammes, were fed on rice from the same supply but cooked in an open vessel, in five weeks all the fowls remained healthy and the gain in weight in the whole group was two per cent. As a result of these observations the practice of cooking rice by steam under pressure was discontinued in the Federated Malay State's hospitals.

The observations on human beriberi, confirming the results of experiments on animals, disprove the claim that beriberi is due to the presence in rice of a toxin generated by the action of micro-organisms. The observations may be explained on the assumption that the original rice contained both toxin and antidote and that in the heating process only the antidote was destroyed but that is only to state the vitamin deficiency theory in other terms."

We absolutely accept the view that avian polyneuritis is caused by food deficiency and it is only when Dr Stanton claims that this disease has been proved to be the same as human beriberi that we differ from him.

The outbreak in the Singapore Jail in 1917-1918 shows that beriberi can occur when the diet consists of parboiled rice cooked by steam under high pressure, but the fact that the disease disappeared soon after the introduction of ordinary steaming does not appear to constitute convincing or even strong evidence that the change in the system of cooking was the cause of the disappearance of the disease. Our experience of epidemic dropsy in India goes to show that the disease often occurs in explosive outbreaks and disappears within a short time even when no change is made in the diet or in the system of cooking. It would be necessary for Dr Stanton to bring forward detailed evidence that the sample of rice which was being used when the disease occurred was the same as that which was used when it disappeared before we could accept the relationship of cause and effect in connection with the method of cooking. We know from extensive experience that epidemic dropsy can appear with great intensity among people who are eating rice of the same kind as before, though no other change has been made in the diet, and, therefore, we think it likely that some undetected change must have taken place in the rice which caused the disease. This explanation of the

outbreak and of its disappearance in the Singapore Jail is inherently possible, and from the analogy of such outbreaks as that recorded by Col Neil Campbell in the Dacca Asylum (*Indian Medical Gazette* September, 1908) and many others in India, it would appear to be by far the most likely explanation. The outbreak which we record in this article and the one reported by the senior writer in the *Indian Medical Gazette* of February 1923 are much more readily explained on the hypothesis that particular

We think that it is quite possible that a form of polyneuritis in man may occur which is due to deficiency of vitamin B in the diet. If this disease actually occurs it is likely that it has been regarded as beriberi, but we should expect to find cardiac atrophy and depression as features of the disease as contrasted with the cardiac hypertrophy and excitation which occur in beriberi.

We believe that it would be unwise and unsafe to ignore the importance of vitamin B as an essential in the dietary of rice eating

TABLE II

*Comparative table of diets of the affected and unaffected persons*

	AFFECTED				NON AFFECTED (CONTROL CASES)		
	Campbell Hostel Cases Grammes daily	Kali Bagan Group (Labouring Hindus) Grammes daily	Parsibazar Group (Labouring Muhammadans) Grammes daily	E B Ry Quarters Anglo-Indians Grammes daily	Bengali girls' boarding school Grammes daily	Working class (Hindu) Grammes daily	Working class (Muhammadans) Grammes daily
Rice	200	360	300	120	180	480	360
Dal	120	120	120	90	120	180	160
Fish	120	60	60	120	120	30	30
Total Vegetables	240	120	120	200 (+ 120 fruits)	200	200	200
Eggs	Nil	Nil	1	2			1
Meat	20	Nil		120			
Milk	Nil	Nil		480	120		
Bread	60	Nil	120	240 (+ 60 sugar)	60		60
Butter & ghee	10	Nil		30	30		
Sugar or sweets	60 + 180	200	200	60	180 + 30	240	200
Total proteins	75	65	85	150	72	70	75
Vitamin B	++	++	++	++	++	++	++
Total Calories	2,200	1,822	2,100	3,000	2,220	2,295	2,180

samples of rice became toxic under certain unknown conditions than by the vitamin deficiency view. For this reason we cannot accept the opinion expressed by Dr Stanton that his experience in the Singapore Jail "disproves the claim that beriberi is due to the presence of a toxin in the rice." It is also important to bear in mind that epidemic dropsy is usually, if not always, associated with the use of parboiled rice cooked in the usual way by boiling in water. We reiterate the opinion that the identity of avian polyneuritis and human beriberi has not been proved, and we hold that the facile acceptance of this view not merely prevents further necessary investigation of the subject but also fails to provide a safe guide for the prevention of the disease.

peoples, at the same time we think that the old view of rice intoxication fits in with the facts which have been observed in connection with epidemic dropsy much better than the vitamin B deficiency view.

In treatment and prevention it is obviously wise to take into account two possibilities (a) of the diet being defective and (b) of the diet becoming poisonous.

Our admission of the importance of the vitamin content of the diet is not to be regarded as indicating that we think vitamin deficiency to be a likely cause of epidemic dropsy. In every form of disease vitamin deficiency is likely to be a powerful predisposing factor, and its possible influence on the course of the disease must be taken into account.

# SOME FURTHER OBSERVATIONS IN RESPECT TO SYPHILIS COMPLICATING MENTAL DISEASE

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IN March 1921 one of us was permitted to publish in the *Indian Medical Gazette* a survey of the patients of the Ranchi European Mental Hospital in respect to the incidence of syphilis among them. The conclusion that was drawn was that syphilis is not more common among the insane and differs in no particulars of its distribution from that found in any general community. Further, it was maintained that except in cases of general paresis and mental disease directly attributable to arterio-sclerosis caused by syphilis, the ætiology of any mental disease is quite uninfluenced by syphilis. The object of the present report is to shew that from the data at our disposal, it is further demonstrable that anti-syphilitic treatment has no particularly beneficial effect on the clinical course of any mental disorder, if we exclude the two varieties mentioned above. Our observations have been made on 113 patients who were admitted into the hospital during 1920 to 1923. Of these 113 patients, 64 were males and 49 were females. All of them shewed a positive Wassermann blood-reaction. Of these cases, 29 males and 23 females received a complete course of treatment, i.e., they have been given N A B injections and mercurial inunctions until their Wassermann reactions became negative and remained negative for the space of one year to all subsequent examinations.

Among the 29 males who underwent a complete course of treatment and whose blood remained at the expiration of the course of treatment negative to the Wassermann test for one year, the changes in mental and physical health are as follows —

Mental improvement occurred in 6 cases, 20.68%

Physical „ „ „ 9 „ 31.03%

(Gauged by absence of loss of body weight)

Among the 23 female patients, the results are —

Mental improvement in 5 cases 21.73%

Physical „ „ 12 „ 52.17%

(Gauged by absence of loss of body weight)

The remaining 35 male patients who were admitted with a positive Wassermann blood-reaction, either received a partial course of treatment or no treatment at all for their

syphilis. The results noticed on their mental and physical health are as follows —

Mental improvement occurred in 15 cases, 42.85%

Physical „ „ „ 21 „ 60.0%

(Gauged by absence of loss of body weight)

Of the 26 female cases in this category, the results are —

Mental improvement in 9 cases 34.61%

Physical „ „ 10 „ 38.46%

(Gauged by absence of loss of body weight)

Considered from the aspect of the type of mental disorder the results for the fully treated cases are as follows —

Disease	Mental improvement No of males	Mental improvement No of females
Dementia præcox	3	3
Secondary dementia	2	1
Epilepsy	1	0
Melancholia	0	1

Disease	Physical improvement No of males	Physical improvement No of females
Dementia præcox	8	5
Secondary dementia	2	5
Epilepsy	1	0

As regards the partially treated or wholly untreated cases the results are —

Disease	Mental improvement No of males	Mental improvement No of females
Dementia præcox	2	1
Paranoia	3	0
Acute confusional insanity	2	0
Exhaustion psychosis	2	3
Melancholia	2	0
Maniac-depressive	1	3
Acute mania	1	0
Epilepsy	0	1
Alcoholic insanity	0	1

Disease	Physical improvement No of males	Physical improvement No of females
Dementia præcox	5	1
Paranoia	3	1
Acute confusional insanity	1	0
Exhaustion psychosis	2	3
Melancholia	2	0
Maniac-depressive	1	1
Acute mania	1	0
Epilepsy	1	1
Alcoholic insanity	0	1

Lastly, the ages of these patients shew that while there is no special decade in which any mental improvement could be demonstrated in cases that had received a full course of treatment, there is among the untreated cases noticeable improvement in the mental condition in the fourth and fifth decades —

Decade	Improved with treatment		Improved without treatment	
	Males	Females	Males	Females
20-30	3	1	0	3
31-40	1	2	8	3
41-50	1	2	4	2
51-60	1	0	1	1
61-70	0	0	1	0
TOTAL	6	5	14	9

From the results recorded above, it appears to us that it is probably correct to draw the following conclusions:—(1) The rigorous treatment of syphilis with arseno-benzol compounds and mercury has not, as might be expected a favourable effect on mental disorders. On the other hand defective treatment or no treatment at all seems to give rise to no untoward results on the mental condition. (2) That finding No 1 supports our contention that syphilis is not an important factor or even a contributory factor in the causation of mental disorders other than general paresis and mental disease caused by syphilitic arterio-sclerosis

### THE FORMOL-GEL (ALDEHYDE) TEST AS A MEANS OF DIAGNOSIS OF KALA-AZAR

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and

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The King Institute, Gundy

TABLE I

Aldehyde test	No of cases in which L D bodies were found by liver puncture	No of cases in which L D bodies were not found by liver puncture	TOTAL
Positive	+++ 45	4	49
	++ 4	4	8
	+ 4		4
Doubtful	(±) 8	2	10
	(±) 2	1	3
	(-) 5	2	7
Negative	— 13	6	19
Total	81	19	100

TABLE II

Aldehyde test	Total	WASSERMANN REACTION			
		Positive			Negative
		Strong	Moderate	Weak	
+++	49	4	1	2	42
++	8				8
+	4				4
(+)	10	2		3	5
(±)	3				3
(-)	7				7
—	19			1	18
Total	100	6	1	6	87

TABLE I shows the results of 100 cases of formol-gel tests conducted by Dr Ramakrishnan of the King Institute, Gundy, with the results classified according to Napier's method of classification as given in the *Indian Medical Gazette* for March, 1923. Of these 100 cases, 62 cases were independently tested by another observer Dr V K Narayana Menon, and were cases under Colonel Elwes' observation in his wards at the General Hospital Madras.

Both observers obtained identically similar results except in four cases, which means that the results only differed in 6.6 per cent of the total. The technique adopted by each observer was that described by Napier, and as both observers were working independently and obtained such closely similar results, it will, we think, be allowed that their results are reliable.

A scrutiny of the results brings out the following important facts —

1 A number of cases which are kala-azar as proved by the finding of Leishman-Donovan bodies in smears obtained by liver puncture, entirely failed to give positive formol-gel tests. No less than 19 such cases occurred, and in 16 of these 19 cases the formol-gel test was carried out by independent observers.

2 A further series of cases in which Leishman-Donovan bodies were found on liver puncture, gave only doubtful positive formol-gel tests, (±), (±). Ten cases came under this group.

3 Several cases of clinical kala-azar gave positive formol-gel tests but liver puncture failed to reveal Leishman-Donovan bodies. These cases were treated with antimony tartrate injections and six reacted to treatment as did proved kala-azar cases.

4 The formol-gel reaction was positive (+ +) in three cases at first suspected of being kala-azar, but which subsequently proved to be general tuberculosis, spleno-

medullary leucocythæmia and benign tertian malaria, respectively

*Deductions*—(a) Out of a total of 81 proved cases of kala-azar, no less than 23·4 per cent gave a completely negative formol-gel test whilst 12·3 per cent of proved cases gave a doubtful positive formol-gel test. Therefore, in 35·7 per cent of the present series of proved kala-azar cases the formol-gel test was of little or no value.

(b) There is a certain group of cases clinically kala-azar and which reacted to treatment with potassium antimony tartrate in which the formol-gel test was positive, but Leishman-Donovan bodies could not be found, although some of these cases had liver puncture performed no less than three times. It remains doubtful whether these cases were true kala-azar or some similar disease giving the formol-gel test and which reacted to potassium antimony tartrate.

In all these 100 cases the Wassermann reaction has been tested owing to its similarity to the aldehyde test (*vide* Table II). Only 13 of the cases proved positive. There is therefore no fear of confusing the Wassermann and the aldehyde tests.

Note by L. E. NAPIER, M.R.C.S. I.R.C.P.

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THIS communication of Lieutenant-Colonel Elwes and other workers in Madras on the aldehyde test has been shown to me by the Editor who has asked me to add a note for publication with it.

The "aldehyde test" for kala-azar is a non-specific test, that is to say it is a test which is dependent on some change in the blood plasma which occurs in the clinical syndrome kala-azar, but is neither dependent on the presence of the actual parasites that cause the disease nor on the presence of the antibodies produced by these parasites. This change in the blood is probably not brought about by the direct action of the parasite on the blood, but is some small alteration in the euglobulin element of the plasma brought about by the altered metabolism due to the action of the parasite on the various organs of the body.

In the early stages of the disease during the process of invasion by the parasites when the symptoms are often at their most acute stage, although the parasites abound in most parts of the body and certainly in the spleen, the "aldehyde reaction" may be negative presumably because the normal metabolism has not been deranged for a sufficiently long period at this stage of the disease. On the other hand in a case which has had a full course of treatment, is free from symptoms of the disease and in whom a culture of the spleen puncture material shows that there are no parasites present, the test may still be "strongly positive." In a case of this kind it will become negative in the course of three or four months.

The practical value of this test lies in the fact that in no other disease does this change occur to anything like the same extent. In certain diseases it does occur to a limited extent. These diseases include leprosy, advanced tuberculosis and chronic malaria. Little confusion is likely to arise from the presence of the reaction in leprosy because, as pointed out by Muir (1923), the reaction is only present to a degree which is likely to be confused with even a weakly positive kala-azar reaction in cases of leprosy which are very

advanced, in which there has been much tissue destruction and which are therefore clinically obvious cases. When formaldehyde is added to the serum of certain cases of chronic malaria the latter becomes rapidly jellyfied and subsequently develops a certain amount of opacity, but I have not yet seen a case of malaria, who was not also suffering from kala-azar, that gave more than a (+) reaction. In the treated serum from a case of chronic malaria there is usually a characteristic opalescent greenish tinge. A doubtful result of this kind indicates that the case is one of either early kala-azar or of chronic malaria and is by itself valueless but in combination with the clinical picture it is often possible to make a definite diagnosis. A case of malaria whose serum gave a reaction of this nature would probably give a history of fever of some duration and show considerable splenic enlargement, a clinical picture, which, if combined with the presence of *Leishmania* would be associated with a markedly "positive" aldehyde reaction. Working in the Punjab, where kala-azar does not occur, R. B. Pal (1923), reported that "the aldehyde test as used by Napier is not positive in malaria if the standards of this author be taken," but he pointed out that in certain cases of malaria a lesser degree of opacity is observed.

Judging from my own experience I should say that the only danger of confusion with this test lies in tuberculosis more especially intestinal tuberculosis. Although I have never heard of or seen a case of tuberculosis that gave a +++ aldehyde reaction, I had a case in my charge giving a + reaction which I feel convinced was a case of intestinal tuberculosis. It is interesting that workers in Europe and America have not reported that an opacity occurs in tuberculosis, although many thousands of similar tests have been carried out under the name of the "formol-gel test for syphilis."

My experience with the test in spleno-medullary leukaemia is limited to about 6 cases, in none of these was the test positive. In this connection it might be worth noting that Knowles (1920) reported a case with a leucocyte count of 74,500 per cmm in which he demonstrated *Leishmania* parasites.

In my first report on this test (1921) (1922), I did not recognise its limitations as I tested the 90 cases on which the report was based at a time of the year when early cases are uncommon, two cases only gave a negative result. In a subsequent report (1923) I showed that the length of duration of the disease was an important factor which must be taken into consideration in reading all but definitely positive results.

That this test is of any value at all is a distinct discredit to the community. This is to say were conditions for medical relief ideal no case of kala-azar would be allowed to go undiagnosed for the three to six months which are necessary before the reaction becomes definitely positive but in this very imperfect world and more especially in this particularly imperfect country, the great majority of cases are allowed to reach this stage both undiagnosed and untreated. Under these conditions it is an extremely valuable test.

Comparing my last report and the report of the Madras workers, we see that there is no very great discrepancy as far as the "positive" and "doubtful" results are concerned, but there is a marked discrepancy in the percentage of "negative" findings. The figures are—

	Napier (1923)	Col Elwes and others (1924)
Positive	81%	65·4%
Doubtful	16%	12·3%
Negative	3%	22·2%

The explanation of the difference between the two sets of results lies in the fact that the Madras cases are mostly from the wards of the Madras General Hospital. Amongst these there are probably many early cases, admitted as undiagnosed fever, whereas

the supply of definite kala-azar cases is so great in Calcutta that relatively few doubtful cases in the early stages of the disease obtain admission to my kala-azar wards. The experience in the Medical College, Calcutta, where they avoid as far as possible admitting clinically obvious cases of kala-azar, usually referring them to the School of Tropical Medicine, is probably more in keeping with Col Elwes' experience than with mine.

The suggestion of Col Elwes and his collaborators that certain cases of clinical kala-azar may not be infected with *L. donovani* is extremely hypothetical and appears to rest on their inability to find the parasite by microscopical examination of the liver-puncture smear. My own experience of liver-puncture is that it is possible to find the parasites in most kala-azar cases by this method, but that field by field one finds ten times as many parasites in a spleen-puncture smear from the same case. Although in most spleen-puncture smears one finds an average of at least half a dozen parasites per field, there are some cases in which a prolonged search is necessary to find a single parasite in a case of this kind it is usual not to find any parasites at all by liver-puncture. In a few cases in my experience as many as four spleen punctures have been done and the smears examined with negative results in cases which have eventually been proved positive by culture. It is not very unnatural that under these circumstances the Madras workers should have failed to find parasites in the liver-puncture smears in eight cases which gave a positive aldehyde reaction. As six of these cases responded in the usual way to anti-kala-azar treatment it seems probable that they were ordinary cases of kala-azar. If we accept these as cases of kala-azar the percentage of positive aldehyde findings of the Madras workers would be raised to about 70%.

It is in these cases in which the parasites are very scanty that the aldehyde test is of great value even to the worker who has more accurate methods, i.e., spleen-puncture and culture, at his disposal.

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### ON A STANDARD TREATMENT FOR MALARIA

By HUGH W. ACTON,

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#### INTRODUCTION

It is a little difficult at this period of time to discover the reasons which led to the universal use of quinine salts in the treatment of malaria, in preference to the use of the other alkaloids contained in cinchona

bark. According to Sir Leonard Rogers (1910), the following periods may be traced in the history of the treatment of malaria in India—

(a) 1657 to 1804 The use of cinchona bark by ships' surgeons who visited India,—notably Bogue (1657), James Lind (1765), John Clark (1768), and William Hunter (1804)

(b) 1804 to 1847 A period during which,—largely owing to the influence of James Johnson (1804),—the cinchona treatment of fevers was entirely abandoned, and a course of treatment by violent purging, mercury administration in excessive doses, and copious venesection was resorted to. As much as 800 to 900 grains of calomel were given during a single attack of fever, the Presidency General Hospital, Calcutta, used 13,337 grains of this drug in a month, and necrosis of the jaws from mercurial poisoning was of frequent occurrence.

(c) During this interval, quinine alkaloid was discovered in 1880 by Pellitier and Leventon, but the so-called "quinine" of those days was rather the sulphate of all the crystallisable alkaloids of cinchona, than pure quinine sulphate. In 1828 James Annesley not only used this "quinine" sulphate in the treatment of malaria, but also advocated the use of mosquito nets as a preventative of malaria. Corbyn in 1834 was also one of the early pioneers of quinine therapy, whilst Edward Hare resorted to it in malaria. The publication in 1847 of Hare's pamphlet *On the Treatment of Malaria and Dysentery* led to an official investigation of quinine therapy by the Calcutta Medical Board, lasting for one year and the routine use of "quinine" sulphate in malaria became the established order of the day.

It will thus be seen that the use of "quinine" sulphate came to replace that of cinchona bark almost accidentally. The bark treatment disappeared during the period 1804 to 1847, and when re-introduced in 1847 it was in the form of administration of "quinine" sulphate. In 1866 the Madras Cinchona Commission was appointed, to test the relative merits in the treatment of malaria of the different alkaloids of cinchona,—several of which had by then been isolated. The plan adopted was to distribute the different alkaloids to different civil surgeons and collate their reports. No control microscopic observations were possible, as the malarial parasites were not discovered until 1881 to 1890, and the report rested on a purely clinical basis. Even so, it is difficult to understand how the Commission came to advocate quinine in preference to quinidine, for their results with the latter drug were distinctly better than those with quinine. Apparently they considered that when once



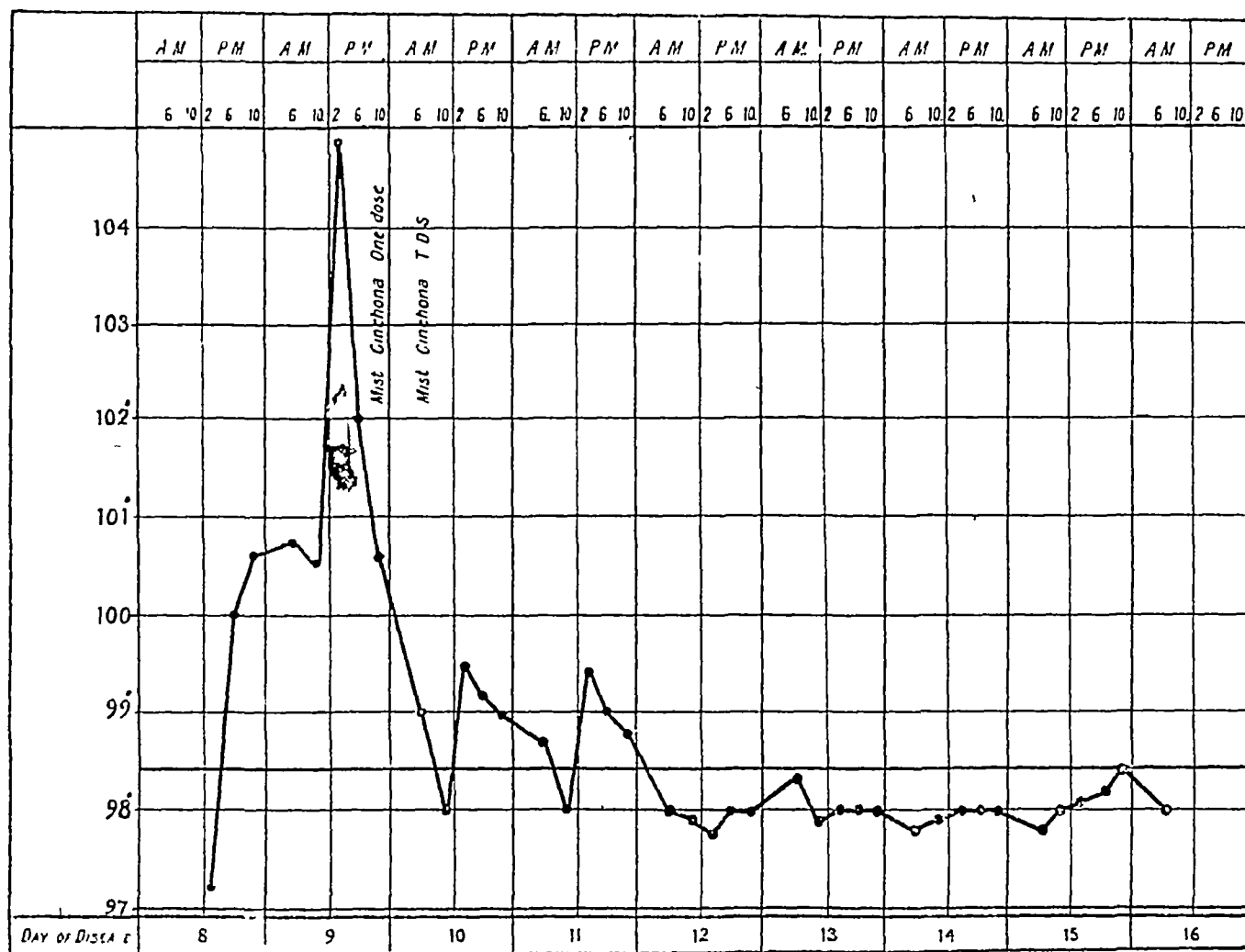
pure quinine sulphate should become available, the ideal cure for malaria would be found

Passing over the intervening years, during which quinine was regarded as the one and only specific for malaria, we come next to the work of MacGilchrist (1914 to 1916). His observations were made on jail prisoners, and the therapeutic activity of each alkaloid was tested by measuring the time that elapsed between the administration of the first dose of the alkaloid and the disappearance of asexual forms of the parasites from the peripheral blood. He placed the alkaloids

Acton (1921) found that the dextro-rotatory cinchona alkaloids (with the exception of cinchonine) are more toxic to *Paramœcium caudatum* than are their lævo-rotatory isomerides. The order of toxicity is as follows —

- 1 Ethyl-hydro-cupreidine
- 2 Optochin, (ethyl-hydro-cupreine)
- 3 Quinidine
- 4 Cinchonidine
- 5 Quinine
- 6 Cinchonine

The corresponding hydro-alkaloids are



in the following order of anti-malarial efficacy —

- 1 Hydroquinine hydrochloride
- 2 Cinchonine sulphate
- 3 Quinine sulphate
- 4 Quinidine sulphate
- 5 Optochin hydrochloride
- 6 Cinchonidine sulphate
- 7 Quinoidine

Further, with regard to the five chief natural cinchona alkaloids,—quinine, quinidine, cinchonine, cinchonidine and quinoidine,—the results *in vitro* upon free-living infusoria corresponded with the results *in vivo* upon cases of malaria.

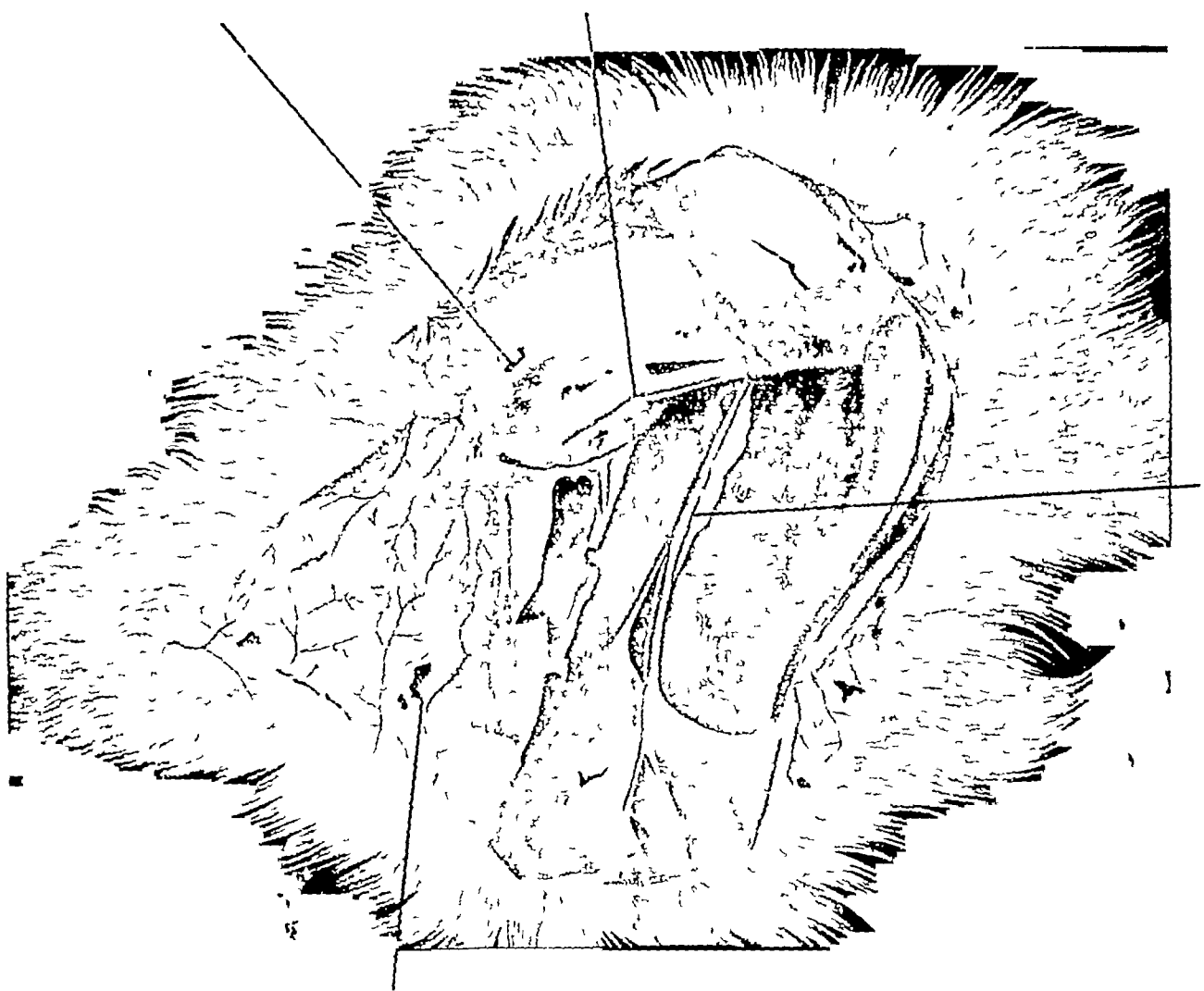
slightly less toxic to paramœcium than are the natural alkaloids. Further, the degree of alkalinity of the environment is of very great importance. The minimum lethal concentration—(i.e. the lowest concentration necessary to kill every individual in a standard dose of paramœcium culture.)—varies with the hydrogen ion concentration. At a pH of 7 it was 1 in 10,000 for quinine and 1 in 20,000 for quinidine, whereas at a pH of 8 it was 1 in 70,000 for quinine and 1 in 100,000 for quinidine. Both experimentally when acting *in vitro* upon paramœcium, and clinically *in vivo* when administered to cases of benign tertian malaria, quinidine proved itself a far more potent alkaloid than did quinine.

Of these alkaloids, cinchonine and quinine are liable to cause vomiting, whilst optochin (ethyl-hydro-cupreine) tends to cause optic atrophy. Cinchonidine is the weakest of the natural alkaloids of cinchona bark, and S. P. James (1922) sums up the situation by saying that the decision as to which alkaloid it is best to employ rests between hydroquinine, quinine and quimidine. The same author also quotes Morgenroth, Giemsa and Werner, and Baermann is reporting that hydroquinine is superior to quinine in anti-malarial efficacy.

dose of 20 grains of quinine sulphate. Acton found the maximal concentration of quinine in the blood to be only 1 in 150,000, and after a single dose of 10 grains to be only 1 in 250,000. Again, in whatever form quinine be administered, it circulates in the blood as quinine base, and is present in the plasma, adsorbed on to the surface of the erythrocytes, but not within them. Hence such parasites as have become intra-cellular escape its action. For all of these reasons, and as the clinical experience of many decades has

Hæmorrhages

Necrosis at site of injection



Subcutaneous œdema, congestion and hæmorrhages

A most important point in the treatment of malaria is that it shall be continuous. In malaria there is some evidence of acidosis in the blood, according to Sinton (1922), and the pH of the blood is probably reduced. To kill off all parasites by a single dose of quinine or other alkaloid, therefore, it would theoretically be necessary to reach a concentration of the alkaloid in the blood stream of something like 1 in 8,000, and this is impossible. After the ingestion of a single

shown, to be efficacious, the cinchona treatment of malaria must be continuous, and a concentration of some 1 in 150,000 or 1 in 250,000 in the blood must be maintained over a period of at least three to four weeks.

In the clinical application of these findings to treatment, we may accordingly lay down the following principles—

(1) The administration of the alkaloid must be continuous over a period of at least three to four weeks.

(2) Its administration should be so timed that it reaches the blood stream at the moment when the latter is at its most alkaline tide. Experimenting with fed and starved cats, in association with Major R N Chopra, I.M.S., we have found that the portal blood stream reaches its most alkaline tide some  $2\frac{1}{2}$  hours after a meal.

(3) The alkaloid should always be administered together with alkalies. It is not possible experimentally to appreciably increase the pH of the blood stream, since the oxygen-carbon-dioxide interchange in the lungs, together with the defensive hepatic metabolism, tend to keep this at a very constant level. On the other hand alkalies tend to increase the absorbing power of the intestinal mucosa, and the chief absorption of the cinchona alkaloids takes place in the small intestine.

(4) It is very far from certain that quinine is the best alkaloid of cinchona to use. Both quinidine and cinchonidine are more efficacious with regard to anti-malarial power.

#### CLINICAL APPLICATION

During 1922, in out-patient and hospital practice generally, we accordingly discarded quinine and commenced to treat malaria with quinidine sulphate plus alkalies. This line of treatment is a most efficacious one, but we soon found that it suffered from certain disadvantages, the first being the high cost of quinidine sulphate, the second the theoretical danger of disturbance to the patient's cardiac mechanism by continuous administration of 10 to 15 grains of quinidine sulphate daily. With regard to the first of these points, whatever the wholesale price of quinidine sulphate may be at Home, it is at present being retailed in India at a price of Rs 39 per lb, and is even more expensive than quinine sulphate at Rs 29 per lb. With regard to the second point, whilst we have personally seen no such ill-effects in almost a year's use of the drug, yet the possibility cannot be entirely ignored.

Accordingly, at the end of 1922, we substituted Indian cinchona febrifuge for quinidine sulphate. For more than a year now, our standard treatment for malarial cases has been as follows —

(1) The patient is given a placebo until the diagnosis of malaria has been verified by the finding of malarial parasites in his blood films.

(2) The diagnosis of malaria having been verified, the following prescription is given —

R Pulv cinchona febrifuge	gr	x
Pulv acidı citricı	gr	xx
Magnesiı sulphatis	gr	xxx
Extractı glycyrrhizę liquidı		
Spiritu chloroformi	m	x
Aquam ad	oz	i

*Dose* — For an adult one ounce is given three times a day, two and a half hours after food, for seven days. The dose is then reduced to one ounce taken twice daily, two and a half hours after food, for a further period of twenty-four days. For children the dose should be reduced proportionately, or rather less than proportionately, since children usually tolerate the mixture well.

The rationale of this prescription may now be considered —

(a) *Pulv cinchona febrifuge*, gr 1. According to MacGilchrist (1915), the composition of the official Indian Government cinchona febrifuge from Mungpoo factory is as follows —

Quinine	7.4 per cent
Cinchonidine	5.84 per cent
Quinidine	22.83 per cent
Cinchonine	18.58 per cent
Quinoidine	29.12 per cent
Moisture, ash, etc	16.23 per cent

so that each 10 grain dose will represent approximately —

Quinine	$\frac{3}{4}$ gr
Cinchonidine	$\frac{1}{2}$ gr
Quinidine	$2\frac{1}{4}$ gr
Cinchonine	2 gr

or  $5\frac{1}{2}$  grains of total active alkaloids per dose, with quinidine,—the most active of the series,—predominating.

(b) *Pulv acidı citricı*, gr 11. This is to secure solution of the cinchona febrifuge. It is converted into carbonates in the gut, and this may help to very slightly raise the pH of the portal blood stream in which the alkaloidal bases act, and to assist in their absorption from the gut.

(c) *Magnesiı sulphatis*, gr 111, to keep the bowels open. Opinion is unanimous that aperients should always be exhibited in the treatment of malaria.

(d) *Extractı glycyrrhizę liquidı*, dr 1 for flavouring, although it must be admitted that hardly anything will really disguise the taste of cinchona febrifuge. On the other hand the above prescription appears to be less nauseating than is the stock quinine one.

With this line of treatment we have yet to see a case which has had more than one rigor after the commencement of cinchonisation, whilst with all three species of malarial parasites, we have not as yet encountered asexual parasite forms later than the third day after commencing treatment.

Patients tolerate the mixture well, but the timing of the dose is important, as cinchona febrifuge may induce vomiting if given shortly after a meal. The chart on p 178 is typical of our whole cinchona series in 1923. The patient,—an elderly Catholic priest,—was a malarial "saturate," suffering from malignant tertian malaria. Owing to his supposed

idiosyncrasy to quinine, he was being treated by his medical attendant, prior to admission to hospital with 2 grains of quinine sulphate three times a day. Films shewed the crescentic gametocytes of *L. malaria*, though the dose of quinine given,—whilst entirely insufficient to control the fever or the symptoms,—prevented the finding of trophozoite and ring forms in films. Before admission he was considered by his medical attendant to be almost in *extremis* after admission and verification of the diagnosis, he was put on to the full cinchona treatment, which he tolerated in full doses with no inconvenience whatever.

There are three disadvantages with regard to this prescription, which may next be discussed.

(a) That "cinchona febrifuge" is not standardised. This is most unfortunately true, and samples of cinchona febrifuge, bought in the open market,—(as well as some of quinine sulphate),—may prove to be heavily adulterated with sodium bicarbonate or other compound. Further, the Indian cinchona febrifuge should always be used in preference to the Java febrifuge. The latter, according to Fletcher (1923), has the following composition—

Quinine	11.5 per cent
Quinidine	5.0 per cent
Cinchonine	26.3 per cent
Cinchonidine	20.0 per cent
Ash, residue, etc	37.2 per cent

and is much weaker in the most active alkaloid, quinidine, and much stronger in the most nauseating alkaloid, cinchonine, than is the Indian official cinchona febrifuge. In common with Fletcher, we consider it most essential that Government should take steps to standardise and define the preparation known as "cinchona febrifuge."

(b) That the mixture may produce vomiting. As far as our clinical experience of over a year's duration goes, it does not do so, *if administered at the time indicated*. Perhaps one case out of 25 or 30 shews nausea, and sometimes vomiting. If so, the simplest measure is to reduce the dose to one ounce twice a day, in place of one ounce three times a day, during the first seven days. One ounce twice a day, as far as our present results go, is always well tolerated by an adult. Or there are several other alternatives. Five grains of quinidine sulphate may be substituted for the ten of cinchona febrifuge, and especially so for private and well-to-do patients. Or a small dose of tincture of opium may be administered prior to the dose of cinchona febrifuge mixture. Or the cinchona febrifuge may be administered in gelatine capsules, followed by the other ingredients in solution. The simplest remedy,

however, is to reduce the three doses a day for the first seven days to two a day.

On the other hand the advantages of some such formula are immeasurably greater than its disadvantages. The present retail prices of quinine sulphate and of cinchona febrifuge on the Indian market are respectively Rs 29 and Rs 9 per lb. The routine use of some such prescription in India, in place of the stock quinine mixture at present in vogue, would save many lakhs a year in the drug bill of India. Secondly, the prescription is eminently suitable for wholesale dispensary and hospital use. Thirdly, it is more efficacious than is the current stock quinine mixture.

On this last point, the evidence which we can offer is, unfortunately, limited, as it is almost impossible to get patients in Calcutta to stay in hospital for the 31-day course of treatment, and quite impossible to get them to come for from six to eight weekly subsequent blood examinations. Further, if malaria should recur during the eight weeks after the conclusion of treatment, one would not know whether it was due to relapse of the original infection, or to fresh re-infection, in fact it is almost impossible to test the efficacy of any line of treatment for malaria in the plains of India, and one of our chief reasons for the publication of this paper is to appeal to workers in the hills to test some such treatment experimentally. In a hill station at an altitude of over 4,000 feet, and in a depôt for convalescent troops, conditions are ideal for testing the efficacy of any given treatment for malaria, since re-infection can be excluded, carrying anophelines are usually absent and such attacks of malaria as do occur amongst such patients are *ipso facto* due to relapse and not to re-infection. It is well known that malignant tertian malaria is the type of malaria least liable to relapse after treatment. With regard to benign tertian malaria, it has been shewn by Stephens, Yorke Blacklock, Macfie and O'Farrell (1919), that 83.2 per cent of relapses occur during the first 20 days after completing treatment, 13.74 per cent in the next 20-day period, 2.58 per cent in the third 20-day period, and only 0.51 per cent in the fourth 20-day period. Accordingly, the best way of testing the efficacy of any treatment for malaria in a hill station depôt, would be on the following lines—

(a) The patient must first be kept off all treatment until the type of infection present has been verified by laboratory findings either at the hill station depôt, or previously in the plains.

(b) The full course of treatment—here a course of cinchona febrifuge in solution for 31 days—should then be administered *under personal supervision*.

(c) The patient should now be kept under observation for a further 60 days, during which period at least eight examinations of the blood should be made

It is only under some such conditions that the real efficacy of any line of treatment for malaria can be properly investigated

A further clinical advantage about the cinchona prescription given above is that it does not upset digestion in the way that large and repeated doses of quinine do. There are two errors habitually committed in the administration of quinine for malaria in India. The first is to give excessive doses over prolonged periods, which ruin the digestion. A good instance was seen in the case of a governess who had gone to a clinician in Calcutta, when suffering from fever. No blood examination was made, but the patient was told to take 30 grains of quinine sulphate in solution by the mouth for a month. At the conclusion of this month's treatment, a further two month's treatment with 30 grains a day in solution was prescribed, and this the patient faithfully carried out. When seen at the end of the third month, she was in a most pitiful condition: gastric and tryptic digestion were almost in abeyance, the patient had lost two stone in weight, she was almost completely deaf, and had visual disturbances as well. Although the medical man concerned made Rs 64 over the case, he ought almost to have been sued for malpraxis.

An almost equally bad error is to prescribe quinine in insufficient doses. Very frequently the patient or his medical attendant gets the idea that, for some reason or other, the patient is intolerant to quinine, that he will not stand such doses as 30 grains a day, and, accordingly, such doses as 2 grains t.i.d.s are prescribed. These are wholly insufficient to control the fever, they render the search for parasites in the blood films hopeless, whilst they may precipitate an attack of blackwater fever in a susceptible subject. The chart given illustrates the uselessness of 6 grains of quinine a day in a case of malignant tertian malaria,—the patient having been on this "treatment" for the seven days prior to admission to hospital.

Finally, compounders are much less likely to steal cinchona febrifuge, than to steal quinine. One of the commonest reasons for the failure of quinine therapy in malaria is that the prescribed doses never reach the patient's blood stream. The compounder may substitute 1 or 2 for 10 grains of quinine, and steal the rest,—a most profitable arrangement with quinine sulphate at its present price of Rs 29 per lb., or the patient, who dislikes the taste of the mixture may avoid his dose—or, if taken, he may vomit it. It is of considerable importance in the treatment of malarial cases in hospital

that some really responsible person should see to both the preparation and administration of the medicine, and that the urine of such patients as are on quinine or cinchona treatment should be examined for the cinchona alkaloids, to make sure that they have actually received the doses prescribed. This test is simplicity itself. A few drops of Mayer's reagent—(13.55 gm of mercuric chloride and 49.8 gm of potassium iodide in a litre of water)—are added to the urine in a test-tube. If quinine, quinidine or cinchonine are present in the urine there will follow cloudiness or opacity. Albumin also produces a cloudiness, and if present should be removed before the test is applied. Taken on the whole, however, the daily testing of the patient's urine will shew whether he is or is not receiving the cinchona mixture prescribed. As Fletcher (1923), has shown, the results of such an investigation are very interesting, the urine of 66 out of 233 patients who were supposed to be on full quinine treatment failed to give a positive reaction, and he concludes that at least 25 per cent of the quinine prescribed in hospital practice is not swallowed by the patients.

#### SPECIAL CASES

For algid, cerebral and comatose cases of malaria, or where there is vomiting and intolerance to the cinchona alkaloids by the mouth, quinine should be administered intravenously. As far as we can ascertain, the present, and almost universal practice,—in Bengal at least,—is to give quinine or cinchonine intramuscularly, in fact, many practitioners appear to treat *all* their cases of malaria with intramuscular injections of quinine or cinchonine.

We wish that the advocates of intramuscular quinine,—and, above all, those who are to-day teaching this pernicious mode of administration to medical students,—would but pause to try such injections experimentally in animals before they advocate the procedure for man. Whether quinine or cinchonine or other cinchona alkaloid, be used, after intramuscular injection into a rabbit, the invariable sequel is local necrosis at the site of injection. If quinine or cinchonine base be used, there is necrosis and necrosis only. If—as is usual—an acid salt be used, in addition to this necrosis, is super-added acute hæmorrhagic inflammation and exudation. The plate reproduced on p. 179 shews the conditions present 24 hours after an injection of two minims of a 50 per cent solution of cinchonine dihydrochloride into the gluteal muscles of a rabbit, and is typical of the results which occur.

In man, the same changes always follow. Usually the focal necrosis is limited and is very gradually absorbed and replaced by

scar tissue, leaving a painful lump which persists for some weeks or even months. If a nerve, such as the sciatic, be accidentally struck, however, permanent paralysis may ensue, whilst if sepsis be super-added, the consequences are disastrous. We hope that the publication of Fletcher's "*Notes on the Treatment of Malaria*" (1923), may do something to stop the almost universal intramuscular use of quinine or cinchonine salts in Bengal. Some of his cases may here be cited—

1 A young and healthy child crippled for life from paralysis of the sciatic nerve, which had been injured by an injection of quinine.

2 A man who, a year before had been earning good wages as a motor-car driver, but who had become a pauper, on account of ankylosis of the left knee and ankle,—the result of an injection of quinine.

3 A man with a healing abscess in his right deltoid, the result of an intramuscular injection of quinine 47 days before, and also a healing abscess in his left deltoid from the same cause. This patient, in the meantime, had nearly died of septicaemia.

4 A mechanic bed-ridden for several months with abscesses and discharging sinuses in the buttocks, the result of injections of quinine.

5 An engine driver who had been given injections into the deltoids for a mild attack of malaria, and who had been unable to work for several weeks in consequence. A large discharging sinus was present over the right deltoid.

6 A patient with three incisions leading into an enormous abscess in the left gluteal region, due to an intramuscular injection of quinine 55 days before. The gluteal muscles were largely destroyed and the use of the limb was permanently impaired.

7 A patient with three sinuses which had been discharging pus for several weeks, with the greater part of the affected muscles destroyed.

Also many other such cases. One of the worst of such instances which we have seen recently was the case of an officer in the Royal Engineers who sustained two abscesses in the right forearm as the result of intramuscular injections of quinine. To such a highly trained officer, the use of his right forearm is invaluable, and the folly which had led his medical attendant to select such a site for the injections is almost incredible.

Finally, as Fletcher (1923), has shewn, "after intramuscular injection, quinine is absorbed less rapidly than after oral administration and the method does not maintain an effective concentration of quinine in the body for a longer period than does quinine orally. The view that quinine injected into a muscle forms a reservoir which keeps up the supply of quinine in the peripheral blood, has no basis in fact."

Under these circumstances, for algid, comatose and cerebral malaria, or where the patient cannot tolerate cinchona febrifuge or quinidine sulphate by the mouth, quinine should be given intravenously. (Quinidine is too toxic and cinchona febrifuge unsuitable for intravenous use.) The preparation

which we prefer is quinine acid hydrobromide.

In giving such injections, certain precautions must be observed. As McCarrison and Cornwall (1918) have shewn, intravenous injections of quinine cause a profound fall of blood pressure and affect the respiratory centre. Hence they must be given with the patient in the recumbent posture. Since, however, these injections should be reserved for critical cases, this will follow almost automatically.

Secondly, the injection must be a "clean" one into the lumen of the vein, since any quinine which escapes into the tissues will cause acute necrosis. Thirdly, the injection must be given *very slowly*. J. D. Thomson (1917) advocates using a very fine needle and taking at least 20 seconds over the injection of each c.c. of solution, whilst McCarrison and Cornwall (1918), advocate taking a blood pressure reading as a preliminary, and adding 0.3 c.c. of commercial adrenalin solution to the injection in cases where the blood pressure is below 100 mm. of mercury. Lastly, the solution injected should be freshly prepared, since moulds grow very readily in old quinine solutions.

We consider, however, that the dangers of intravenous injections of quinine have been greatly exaggerated. We have given several hundreds of these injections without seeing any of the dramatic sequelæ described by some writers, whilst the junior writer has received some 30 such injections at different times in the treatment of a chronic benign tertian infection as a patient. The injection is followed by a transient feeling of dizziness, lasting for only a few seconds, whilst quinine can often be tasted in the mouth before the injection is completed. The dose which we usually use is from  $7\frac{1}{2}$  to 10 grains—not more—of quinine acid hydrobromide freshly dissolved in from 15 to 20 c.c. of sterile saline. We consider the dose advocated by S. P. James (1922), of 15 grains of acid hydrochloride in 5 c.c. of saline as being rather too large and rather too concentrated.

In the majority of such critical cases, one or two such intravenous doses of  $7\frac{1}{2}$  grains each, given during the first 24 hours, will speedily bring the patient into a condition of comfort with a normal or sub-normal temperature. The intravenous injections should then be discontinued and the patient should commence the full 31-day oral course of cinchona febrifuge. Intravenous quinine, although the strongest weapon in the physician's armamentarium for the immediate treatment of a critical attack of malaria, is useless in the prevention of relapses, and fails to sterilise the patient of parasites. As Ramsden, Lipkin and Whitley (1918), have shewn, about 90 per cent. of the quinine

injected intravenously disappears from the blood stream into the tissues within one minute. During that minute, however, the physician knows that the quinine is present in the circulation in maximal concentration, and that its full destructive effect is being exerted upon such parasites as have not reached the "safe area" within the erythrocytes.

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## NOTES ON THE ÆTIOLOGY OF SOME SKIN DISEASES MET WITH IN THE TROPICS\*

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SKIN diseases are very common in the tropics. In Calcutta, in the skin out-patient department of the School of Tropical Medicine and Hygiene, a unique opportunity is afforded for the study of many of these dermatoses. Besides the well-known ætiological factors, many new ones have come under our observation.

*Age*—The age incidence of leucoderma is from 1 to 2 years and upwards, and the commonest period of onset is in the second and third decades of life. Leprosy and filarial lymphangitis and elephantiasis are rare

in children. As mentioned in books, we found impetigo contagiosa very common in children, tinea tonsurans under 10 or 12 years of age, acne vulgaris in adolescents and psoriasis in advanced age.

*Sex*—It is difficult to study the sex-factor in India, as all classes do not seek treatment in an out-patient department owing to the prevalence of the *pudah* system.

Lupus erythematosus is more common in women and association of leucoderma with it has been noted in one or two cases. Tinea cruris is seen more commonly in males, as in the tropics many males suffer from hydrocele or scrotal tumour and sweat collects and decomposes in the space between the scrotum and the thigh and this favours the development of ringworm fungi. Similarly in fat women with large breasts tinea cruris has been seen under the mammæ and between the folds of the abdomen.

Mangoe-toe is common in middle class females in Calcutta, as they have to work barefooted on damp ground floors and swampy courtyards containing watertaps and reservoirs. Many cases of leucoderma in unmarried young girls have come under observation, as the question of marriage compels them to seek treatment.

*Race*—Tinea imbricata is very commonly seen amongst Oorias and boatmen, as they usually live together crowded in damp huts. The prevalence of elephantiasis of the legs in Anglo-Indian girls has always struck us. This may be due to following factors—the wearing of tight corsets, their usually sedentary life indoors, and negligence in the use of mosquito-nets. Jews are especially liable to folliculitis and scabies, as they adopt European habits in the matter of dress, but do not keep themselves sufficiently clean. Freckles are seen on exposed parts of Europeans as the melanoblasts are stimulated by the actinic rays of the sun.

*Occupation*—Several cases of occupation dermatitis have been noticed by us. The presence of callosities on the shoulders of some Oorias is due to their trade of carrying palanquins. Dermatitis of the fingers and nails in nurses is caused by vigorous soap-and-water scrubbing and the free use of irritant antiseptics. Varnishers, jute mill employees and people working with tar are liable to irritation dermatitis, otherwise called trade dermatitis. These diseases would not be so common if the patients washed themselves properly after their day's work. Fishermen get peculiar urticarial eruptions, probably due to stings of *hydraz* which are abundantly present in the waterways of Bengal.

*Habit and Dress*—These play an important part in the ætiology of many skin affections.

\* Being a paper read at the Medical Research Section of the Indian Science Congress 1924



Folliculitis of the legs is very commonly seen in patients who wear *dhotis*. These set up continuous friction on the hairs of the parts, hence the disease when once started is difficult to cure. *Dhoti* friction is also responsible for the occurrence of leucoderma on both sides of the waist where the loin cloth presses most. Most Indians are in the habit of putting on shoes without socks and hence irritation dermatitis is set up along lines of pressure. *Tinea cruris* is seen on the waist, as the pressure of the *dhoti* and moisture or sweat predispose to the disease. The affection is less often seen in females than in males as already mentioned. This may be due to the fact that the mode of dressing in Indian Hindu females affords a better ventilation of their private parts. The same applies when we find *tinea cruris* more commonly in Europeans than in Indians. In Europeans, the friction of the coat on the villæ favours the development of boils and the prevalence of mangoe-toes in them is due to the pressure of boots keeping the outer toes in close apposition. *Favus* is commonly met with in the frontier tribesmen as they are in the habit of interchanging one another's head caps. Corns, *keratoma plantare sulcatum* and hyperkeratosis are usually seen in poor class Indians who do not wear shoes and at the same time have to walk over the hard fields during the winter and in damp swamps during the rainy season.

Friction of ornaments sometimes gives rise to irritation dermatitis. Unclean habits are often factors in such skin diseases as scabies and folliculitis. Nag's sore is usually found on the exposed parts of the body, namely, the legs, hands and forearms and consequently Europeans are rarely affected with the disease.

*Geographical distribution*—There is a very peculiar distribution in connection with certain diseases, e.g. Madura foot disease in Southern India, yaws in Ceylon and Burma, oriental sore in Bombay and Delhi, infective granuloma in Madras and the Himalayas, and filarial lymphangitis along the sea coasts and large rivers. This peculiar limitation of diseases to certain provinces is due chiefly to climatic conditions. Leprosy is one of the commonest skin diseases in the tropics and in our out-patient department it forms about 10 per cent to 15 per cent of all dermatoses, in marked contrast with the percentage in a similar out-patient department in England.

*Season*—Medical practitioners sometimes get the credit of curing certain skin diseases owing to the simple fact that many skin affections disappear as the seasons change.

In the cold season, streptococcal dermatitis, "eczema" and sometimes psoriasis are common.

In the hot weather staphylococcal infections such as folliculitis, boils, etc., and also seborrhœic dermatitis are more prone to occur, and I have seen several cases of folliculitis of the lower legs entirely clear up in the cold season even without treatment.

During the rainy season ringworms are specially common, as the fungi require moisture for their development. Similarly our culture plates become quickly infected with various fungi, the spores of which keep floating in the humid atmosphere.

*Idiosyncrasy*—This is shown by some to certain foods and drugs. We have seen several cases of urticaria due to eggs, dal, etc. The susceptibility to drugs, giving rise to eruptions, etc., is chiefly seen with the following—iodides, cantharides, quinine, aspirin and sulphur. Many of these act by upsetting digestion. Arsenic causes dermatitis in persons not actually idiosyncratic, but in fact poisoned by repeated administration.

*Diathesis*—A family tendency and predisposition to skin diseases are sometimes seen. Diabetics are liable to carbuncle and tuberculides are often found in patients suffering from tubercular glands. Scleroderma has been found by us to be closely associated with thyroid-deficiency and we have cured cases partially or completely by prolonged administration of thyroid. The hyper-pigmentation of the skin in kala-azar is due to disease of the suprarenal capsules. Eczema and asthma are sometimes found related to each other. When the eczema subsides the asthma becomes worse, and *vice versa*. The general health is sometimes responsible for skin affections. Patients poor in health are more often victims to cutaneous troubles such as eczema, folliculitis, scabies, etc.

*Chemistry and Texture of the Skin*—Many skin affections are partly or wholly dependent on the chemistry and texture of the skin. Cases have been known where, for example, the husband has been suffering from an extensive ringworm infection for years, whilst the wife is entirely free from it. The same sometimes holds good with streptococcal dermatitis (eczema). The hydrogen ion concentration of the skin fluids is probably responsible for this predisposition. As regards the texture of the skin, we have seen acne vulgaris more commonly in coarse and oily skins.

*Infective Diseases*—The skin lesions of such infective diseases as typhoid, small-pox, erysipelas, measles, etc., are all well known. During the last epidemic of fever in Calcutta, probably many noticed the characteristic measles-like papulo-erythematous skin rash of dengue.

Syphilis forms an important ætiological factor in many skin lesions. It manifests itself on the skin in various forms, namely,



primary sore, secondary eruptions, rupia, maculae, eczema, nodes, gummatous ulcers, pseudo-psoriasis, leucoderma, pigmentations, hyperkeratosis, alopecia, granuloma, etc. It is the practice of many medical men to look upon most of the skin diseases encountered in the tropics as being syphilitic in origin, and we are often surprised to see Wassermann reaction reports and histories of novarsenobillon injections in such diseases as streptococcal dermatitis, simple psoriasis, folliculitis, simple leucoderma, seborrheic dermatitis, etc. Our out-patient records show that syphilis is the cause of only a very small percentage of skin diseases in the tropics.

*Congenital and Familial causes*—Among the congenital and familial diseases, only three have come under our observation—namely, ichthyosis, epidermolysis bullosa and von Recklinghausen's disease.

In epidermolysis bullosa, a loss of elasticity of the upper layers of the corium occurs, and the epidermis gets easily separated from the dermis by trauma and lymph pours into the spaces, giving rise to the characteristic appearance. Some cases of von Recklinghausen's disease have progressed favourably under fibrolysin treatment.

*Parasites*—Of all the parasites giving rise to cutaneous troubles, ringworm fungus and streptococcus infections are the commonest. Our out-patient records show that tinea or ringworm is the commonest of all the dermatoses in Calcutta. The parasitic fungi have up to the present been grouped under the terms ringworm, seborrhea, blastomycosis, sporotrichosis, etc. Streptococci are responsible for many skin diseases, (*viz.*, "eczema," impetigo, lymphangitis, Veldt sore, erysipelas, eczema of the lower lip or mouth, etc.) The old term "eczema" has often been replaced by us by the term "streptococcal dermatitis." In the vesicular stage of eczema no streptococci are present. The vesicles are due to liquefaction of the prickle cell layer and this is often brought about by the fungi of ringworm, as the presence of spores has been demonstrated on the inner surface of the wall of the vesicles. As the vesicles enlarge they come to the surface and become invaded by streptococci, yeasts and staphylococcus aureus and albus. The clear watery fluid of the vesicles has been very rarely found to contain streptococci and cultures on blood, glucose, and serum-agars and ordinary agar have all been negative. But when the fluid becomes slightly opalescent or when the vesicle has just broken, streptococci are almost invariably present. Hence it often becomes difficult to culture streptococci from every case of so-called "eczema." These streptococci are mostly hæmolytic, non-lactose fermenters, aerobic or anaerobic, and on intravenous injection into rabbits some-

times give rise to arthritis, septicæmia and death.

The fine yeasts that are sometimes found in the vesicular fluid are often confused with streptococci, but the best test for differentiation is by culturing in glucose broth when the characteristic chains of streptococci are never mistaken. In Veldt sores, intracellular streptococci are present and a secondary infection with the *B. fusiformis* has been seen.

The oedema of filarial lymphangitis is due to obstruction of the lymphatics by filaria, but the inflammation and fever are due to invasion by streptococci.

Animal parasites are often responsible for tropical troubles. Scabies and pediculosis are not very common. Bites by mosquitoes and bugs have sometimes struck us. The mosquito bites are seen very commonly on the face and on fair skins and often appear like the lesions of folliculitis or chicken-pox. Bug bites are often like urticarial eruptions.

My thanks are due to Major Acton, F.R.S., Professor of Pathology and Bacteriology, School of Tropical Medicine and Hygiene, Calcutta for kindly going through this paper and giving valuable hints and suggestions.

#### POISONOUS WHEAT

By ANAND SWARUP, M.B., B.S.,  
District Hospital Ballia

In the July 1922 issue of the *Indian Medical Gazette* there appeared a short note by me on acute *kodon* poisoning. I understand that investigation on the poisonous variety of this grain is being carried out at the Calcutta School of Tropical Medicine. Meanwhile it may be interesting to note that I came across closely similar cases of poisoning resulting from a variety of wheat at Ballia, a town in the eastern part of the United Provinces. Fortunately I have been able to secure a sample of the flour which I am sending to the School of Tropical Medicine, Calcutta, for expert opinion and investigation.

On the morning of the 31st October 1923, I was called to see a friend of mine, Dr D. N. M. He complained that he was suffering from a strange weakness and shaking of his limbs and a feeling of giddiness, as if he was drunk. The night before he had gone to bed in good health. I could not account for this condition, but took it to be due to the premonitory symptoms of malaria and so a 10 gr. dose of quinine mixture was prescribed. In the evening I saw the patient again. The giddiness and the trembling of the limbs were the same, if not worse. The patient also felt drowsy. The temperature was normal. I gave a mild purgative.

Next morning I was surprised to note that all the symptoms had increased and the

patient was even unable to hold anything in his hands owing to tremors. During my conversation with the patient it transpired that his cook was also down with a similar complaint. On examining this man I found that his condition was even worse, he had also vomited several times. This set me thinking and I suspected some food poisoning. It was soon discovered that new flour had come into the house only two days before and it was apparently owing to the eating of this flour that these symptoms had come on. I, therefore, advised them not to eat this flour, but to get a fresh supply of good flour from some other shop for their consumption. The suspected flour was stored separately.

In the evening, when I went to see these cases a third case was reported to me. Another servant of Dr D N M without permission cooked the suspected flour for himself and partook of it liberally. I found him in a drowsy condition, but he could be roused by shouting. When he was made to stand he began to reel like a drunken man, and could only support himself with difficulty by the aid of the wall. This confirmed my suspicions that the wheat flour was poisonous. Unfortunately the whole of it was finished by the servant and so a sample of it could not be secured.

Next morning, however, I was called to see six persons in one family suffering from similar symptoms and none of them could account for the condition. For me, however, after my experience of the previous day, it was not difficult to diagnose these cases, and my view was confirmed by the patients' own statements. Only a few days before they had bought some wheat in the bazaar and had it ground in a local flour mill. They had begun eating this only a day before. Those members of the family who had taken rice only escaped this poisoning. There were six cases.

*Case 1*—B P, aged 26 Hindu male, took *chapatis* of the suspected flour at 9 p.m. the previous night, symptoms noticed at 3 a.m. next morning after getting up from bed, vomiting, giddiness, tremors of the limbs, pulse weak and slow, pupils normal, frothy saliva, and a feeling of intoxication. No diarrhoea but two ordinary motions.

*Case 2*—S N, aged 20 Hindu male, symptoms exactly similar, commenced at about 2 a.m. after taking a meal at 9 p.m.

*Case 3*—N P, aged 32 Hindu male, duration two days, had taken *chapatis* made of flour both morning and evening, symptoms similar.

*Case 4*—Sh N, aged 20 Hindu male, duration two days, as in Case 3.

*Case 5*—R, aged 35 Hindu female, duration two days.

*Case 6*—J, a one year old child of Case 5. It was stated that this child had not taken

any *chapatis* but was only fed on her mother's milk. The child had vomited once and according to her mother's statement was ill since the previous day. No other symptoms were noticed.

The remaining flour was secured by me.

As compared to *kodon* poisoning, the symptoms as noted in these cases were of a milder type and there was somewhat delayed onset of symptoms. The case of the child is noteworthy, although not very reliable, showing that the poison is possibly excreted by the mammary glands.

The *kodon* poisoning cases were observed by me in the month of March after the close of the winter season, whereas these wheat poisoning cases occurred early in November, after the rainy season. *Kodon* is harvested in October, whereas wheat in March, so in each case the grain must have been stored for at least six months, and during this storage these grains had developed poison under some unknown conditions. In view of the close similarity of the symptoms, it is probable that the poison in the case of both the wheat and *kodon* is identical, or else the two are closely allied in chemical composition. As far as I could ascertain there was no admixture of *kodon* or any other grain in the wheat flour which caused these cases of poisoning.

Dr S G Gurha, Civil Surgeon, Ballia, to whom my thanks are due for going through this article, believes that the poisonous *kodon* is a distinct species of the grain, quite different from the non-poisonous variety. He says that it is a prevalent idea among village people that a particular kind of *kodon* which they call *matauna kodon* (lit intoxicating *kodon*) is poisonous. It is said that for this grain to become poisonous it is not necessary for it to be stored, but that it is poisonous when plucked direct from the field.

## THE OPERATION OF LITHOLAPAXY AND ITS LIMITATIONS

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My reasons for writing this article—the outcome of some 20 years' experience—are that the technique and the limitations of the operation are not always clearly understood and lead to the adoption of some form of cutting operation when simple crushing, with its rapid convalescence, would meet the case.

It may be taken as an axiom that no two cases of stone are alike, and the operator's manipulative skill and ingenuity may be taxed to the utmost. But with a knowledge of how to meet the difficulties, their overcoming should be a simple matter. There is no more satisfactory procedure in surgery than the removal of a stone that would otherwise inevitably kill, and that without any injury to the tissues and complete recovery of the patient within a day or two.

### I Instruments

1 *Lithotrites*—These must, without question, be of the best. Lithotrites of sizes Nos 4, 5, 6, 7, 8, 10, 12, 15 and 17 and a full set of cannulas are essential if patients of all ages are to be tackled. I have, during my time, handled lithotrites of many makes, but have yet to meet the instrument which, in the long run, gives such satisfaction as Weiss's, this more particularly applies to the smaller lithotrites required for children.

Some of the objections to instruments of other makes are—that they are unnecessarily heavy, too thick at the bend, the fenestration is far too narrow, they lack smoothness in working and locking and, lastly, they frequently open too wide, tempting all but the most experienced to try to crush a larger stone than the instrument is designed for.

2 *Irrigator*—For filling and washing out the bladder syringes have long been discarded. They are difficult to keep in order, much time is wasted in filling them, they introduce air, and most important of all—they are not sufficiently sensitive to tell one when the bladder has been dilated to a safe limit. A graduated glass irrigator of about a quart capacity is used. This is mounted on a movable stand and the height of the top of the column of water above the bladder has been found to work most satisfactorily at 2 feet. The nozzle used is of tapered glass covered with a small piece of drainage tubing and this is found to fit easily into any make of cannula. The flow from the irrigator is controlled by an assistant, who soon learns to permit or check the flow at a sign from the operator, by pinching the tube.

It may be thought that two feet of water is more than the bladder of a child of, say, 2 years will stand the strain of, but this has been found not to be the case.

The actual procedure is as follows—The left hand of the operator placed on the lower abdomen easily feels the bladder gradually dilating until the full capacity is reached, when respirations can be seen to slightly but surely alter the level of the water in the irrigator with each inspiration and expiration. If the child is not deeply under the anæsthetic, he will, by disturbance of respiration, rigidity of abdominal walls, or actual straining, indicate that the full capacity of the bladder has, for the time being, been reached.

In the washing out of fragments, after crushing, the irrigator has been found infinitely quicker and more satisfactory than the use of a syringe.

3 *Evacuators*—In a catalogue in my possession 19 different makes of evacuators are illustrated. They mostly consist of a mass of metal, taps, rubber and glass, are far too heavy and can lay no claim to sensitiveness. The evacuator described by me in the *Indian Medical Gazette* for August 1911 consists of one glass reservoir, a four ounce bulb, a short straight tube and a rubber cork only. It can be used for

either children or adults, is extremely sensitive and does not leak. It is now being made for me by Messrs Weiss and Son.

Whilst on the subject of instruments, a few minor but important points must be mentioned. Among these it is of the utmost importance that a hard cushion of varying height should always be placed under the buttocks of the patient to throw the pelvis well forward.

A stool about 4 inches high, in the absence of a table one can elevate or depress at will, is useful to stand on, since during prolonged crushing, standing on the stool, the operator can bring his arms well over the bladder.

Another tip, during prolonged crushing, is to tie a piece of lint over the wheel of the lithotrite and cut off the surplus lint.

For lubricating lithotrites soft soap has been found the best, any surplus being wiped off the shaft after passing.

A film of oil floating on water contained in a conical glass is used for oiling cannulas.

### II Choice of Operation

The first essential is never to try to pass a larger instrument than can be comfortably manipulated into the bladder. The penile is the narrowest portion of the urethra and it may at times be possible without force to slightly dilate it by means of a cannula and thus enable a larger lithotrite to pass. Similarly, the meatus urinarius very frequently requires incising downwards with a pair of blunt pointed scissors.

"*Litholapaxy has its limitations*"—It is an operation that should be adopted only for stones ranging from a small one impacted in the urethra and pushed back by a cannula, to the largest stone which can be grasped by the largest lithotrite that it is possible to pass. With a stone too large, if soft, it is not always necessary to lock the lithotrite, a smart tap on the handle with a hammer breaks it into two or more fragments.

The limitations of litholapaxy cannot be too strongly urged, and the operator, if not experienced and in doubt, should at once give up any idea of it. I attribute a large number of failures and the consequent disrepute into which this most valuable operation has at times fallen to—

- (a) Trying to perform it in unsuitable cases
- (b) Using unsuitable and bad lithotrites

For the larger and hard stones which cannot be dealt with by simple crushing, and these in my experience amount to about 10 per cent of the whole, there is a choice of two methods—

- (a) Median perineal litholapaxy
- (b) Removal of the stone by cutting alone

Median litholapaxy is a valuable procedure, but one requiring considerable skill. It will be described later. It also has its strict limitations, in all cases where the stone is a really large one, suprapubic cystotomy is recommended as the best operation.

To sum up—

- (a) Litholapaxy, in those cases only where the stone can be easily grasped

(b) Median perineal litholapaxy, where the stone is just too big or hard to be easily grasped or crushed

(c) Suprapubic cystotomy, in all other cases

With experience only, can the range of (b) be increased

Two conditions remain which require a few words. Encysted stone, far more often imagined than existing, and in the writer's experience extremely rare, requires of course suprapubic cystotomy. Stones encysted in the prostatic urethra—and at times they collect in large numbers forming a veritable second bladder—are best removed by median lithotomy, enlarging the wound, if necessary, to admit the finger or a scoop

### III The Operation of Litholapaxy

The first essential is a good anaesthetist who will maintain complete relaxation of the abdominal walls throughout the operation. It is an exacting task which will at times try him to the utmost. In the event of failure to bring about the above conditions after several attempts at dilatation of the bladder have failed it is advisable to give up all thoughts of a crushing operation. Some bladders are no doubt more irritable than others, but I believe that they can all be sufficiently dilated given deep enough anaesthesia.

Deep anaesthesia having been procured, a cannula is passed, and urine drawn off, the bladder washed out once or twice and then filled as described above. The cannula is removed, the penis if necessary pinched from before backwards by an assistant to prevent escape of fluid and a small sound introduced.

The sound, held lightly between the thumb and index finger of the right hand, palm towards the patient's head, verifies the presence of the stone, forms a rough estimate of its size and hardness and explores the walls of the bladder. It is extraordinary how sensitive this instrument can be after a little practice. A suitable lithotrite is then selected. The passing of this instrument is not easy to describe, but it should be done with all gentleness, allowing it to find its own way, to, so to speak, drop in. Standing on the right of the patient it should be held exactly as a knife is held when cutting, that is, nicely balanced, held between the tips of the thumb and second finger, guided by the first finger and with the wheel in the palm of the hand. The beak held downwards is then inserted into the meatus and the instrument allowed to pass until it reaches the triangular ligament. The old "tour de maître" is then employed, the shaft being brought horizontal and dead straight between the line of the thighs, then swept round 180° with the shaft still horizontal and the wheel almost touching the upper abdomen. By then gently raising the lithotrite it should slip quite easily into the bladder. The instrument, then held exactly as the sound was, and used as a sound, locates the stone. It will almost invariably be found in the middle line of the most dependent part of the bladder, that is, in the triangle formed

by the opening of the two ureters and the urethra, an area that may be called the base of the bladder. If the stone is not in this position it must be pushed there. The female blade of the lithotrite is then kept against this base whilst the male blade is withdrawn, and the whole instrument rotated about 45° either side until the stone is caught. It is not possible to clearly express all the details of the procedure in writing, but with very little practice the necessary manipulations can be learnt without any fear of injury to the bladder. If on locking and beginning to screw down, the stone slips, it must be grasped again and in a more favourable diameter. Once firmly grasped, experience alone can tell the operator how much force, short of bending or breaking the instrument, should be used. With the larger instruments, provided they are fitted with a wheel and not a lever, the fullest force that can be exerted with one hand may be used, with the smaller instruments, if in doubt, litholapaxy should be abandoned.

The stone having been broken into two or more fragments, the stage of crushing it to a powder, sufficiently fine to pass through the largest cannula that can be passed, is proceeded with. The female blade as before is held against the base of the bladder whilst the male blade is repeatedly withdrawn, locked and screwed down again. The whole instrument may be rotated about 30° either way or the locked instrument used as a scoop to bring fresh fragments into the crushing position, a slight shake of the whole instrument will often effect this. The lithotrite is then again used as a sound to detect and crush any large pieces, until a characteristic feel of the fully crushed stone is obtained. Towards the end of the crushing process it is not necessary to lock the instrument on every fragment, firm pressure on the wheel being often sufficient, this saves time and is perfectly safe, provided the female blade is kept in contact with the base of the bladder. The last phrase has been repeated so often that I may perhaps explain here that the operator should always have a picture in his mind's eye as to where the fragments actually are, they practically always fall to the base of the bladder by the force of gravity. Regarding the introduction of a lithotrite more than once, it should be the aim of the operator to avoid over-instrumentation and the smaller stones may well be crushed with one introduction, with larger stones it may be necessary to withdraw the instrument, wash out, and reintroduce. Some operators may fear clogging of the lithotrite during crushing, this will only occur—

(a) With insufficient dilatation of the bladder

(b) Using badly designed lithotrites

Both of these are avoidable causes

The final stage of washing out the crushed fragments demands much patience and is often the most tedious part of the operation. The evacuator may be used from the start, or a large portion of the fragments got rid of by filling the bladder, grasping it with the palm of the left

hand—almost as one would the bulb of an evacuator—keeping the end of the cannula on the base of the bladder and gently shaking it. All cannulas should be provided with suitable stilettes with which they can be quickly cleared if blocked. Repeated blocking of the cannula calls for a reintroduction of the lithotrite. If the evacuator is used, the bladder should naturally be partially emptied before driving the fluid in from the bulb. This latter instrument is extremely useful in washing out the last fragments and in satisfying oneself by the absence of "click" against the eye of the cannula that a fragment does not still remain to be crushed. Finally a small size sound should be introduced into the dilated bladder and the latter thoroughly searched for fragments or sand, the aim being to remove all possible source of future irritation.

### *II Median Perineal Litholapaxy*

It is not proposed to discuss the opinions of the many Indian surgeons who have written on this procedure, but to state in a few words the method that has been found the easiest by the writer. The exact position of the incision, whether it opens the membranous or the prostatic portion, and other points have been much discussed, these must necessarily vary with the anatomy of individual cases, with the size of the opening required to remove the stone, and with the avoidance of the remote possibility of wounding the rectum.

The bladder is filled, a median grooved staff, of as large a size as can be passed, is introduced and the patient is put in the lithotomy position. His body must be perfectly straight, and the two limbs equally flexed and kept so throughout the operation thus avoiding shifting of the fascial planes of the perineum, a most important point. The staff is held accurately in the middle line by an assistant, with the bend, if possible, made prominent in the perineum. A point is then chosen in the middle line, generally midway between the margin of the scrotum and the anus, at which to enter the knife. With the cutting edge held downwards, it is better to fix one's eye on the visible portion of the groove in the staff beyond the penis. A quick stab should then hit off the groove at some point of the bend of the staff. If the groove is not struck at once, the point of the knife may be made to feel for it with little fear of damage to the issues. The knife, now used as a cutting instrument, is pushed on about  $\frac{1}{2}$  of an inch, and then, as it is withdrawn, made to enlarge the skin wound downwards to a sufficient extent. Beginners may feel more confident with a finger in the rectum, but it is not generally necessary. Assuming that a sufficiently large and clean cut incision has been made, the knife is laid aside, a probe is passed along the groove in the staff, into the bladder and the staff removed. A director is then passed along the track of the probe, the two are gently separated so as to stretch the opening, the director removed and a few Hegar's dilators introduced

to stretch and clearly define the passage. Many operators advise that the probe should always be left as a guide to the track and it is a good precaution for those not used to the operation, but if the above details are followed, especially keeping the patient strictly in his original position, it should be unnecessary.

A sufficiently large lithotrite is introduced, the female blade kept on the base of the bladder and crushing proceeded with exactly in the manner described under simple litholapaxy. Any leakage of fluid during crushing can be at once stopped by the pressure of an assistant's thumb covered with lint, not against the instrument, but directly upwards, in the direction of the patient's head. The crushing completed, a large cannula is introduced and washing out of the fragments proceeded with, this again may demand considerable patience, but is much facilitated by using the evacuator. To assure rapid healing of the wound, no sand or mucus-entangling small fragments must be left, a No. 4 cannula should be attached to the irrigator, the latter held high, and a thorough flushing and cleansing of the wound track carried out. A small dressing is then applied and the knees tied together. Urine will escape from the wound for the first day or two, but healing should be complete in two to five days.

### *V The Operation in Females*

In the writer's experience the incidence in females amounts to about 10 per cent of the total cases. These generally present no difficulty, and the procedure can be most aptly likened to that followed in median perineal litholapaxy without the necessity of making an incision.

There is a limit, especially in children, to the extent to which the urethra can be safely dilated with Hegar's dilators, that limit is best defined by laying down that no force whatever should be used. If a sufficiently large lithotrite cannot be passed, a suprapubic operation is preferable to vaginal lithotomy.

### *VI The after complications*

Generally speaking there are none. If all gentleness has been observed and all fragments finally removed, patients are well and fit to be discharged within 24 hours. With the bladder acutely inflamed before the operation, a few extra days may be required, but the quickness of recovery is remarkable, once the source of inflammation has been removed.

The description of the operative procedure has been planned to meet the case of a child of 2 years or so. It will be found that with increase of age up to adult life the procedure becomes correspondingly more easy. The mortality, if one excepts the presence of advanced kidney disease and this generally is only found in very old men, should be nil.

*Record of 66 consecutive Operations for removal of Stone from the Bladder done by the author at Nasik in one year (1923) with no deaths*

This does not include 8 cases of stone impacted in various parts of the urethra and removed by cutting.

Serial No	Age	Sex	Weight		Nature of Operation	Days in Hospital after operation	REMARKS
			Dr	Gr			
1	3	M		18	L	2	
2	28	M	4	50	"	2	
3	5	M		20	"	1	
4	3	M		21	"	1	
5	3	M	3	10	"	1	
6	4	M	2	20	"	2	
7	4	M	1	30	"	2	
8	4	F	2	30	"	2	
9	6	M	1		"	1	
10	8	M	2		M P L	15	Ovalate
11	12	M	2	25	L	2	
12	4	M		6	"	4	
13	4	M		36	"	1	
14	13	M	1	11	"		
15	8	M	1	20	"	2	
16	20	M	4		"	2	
17	21	M		20	"	1	
18	5	M	11		S L	11	
19	4	M		30	L	1	
20	4	M		50	"	1	
21	3	M		53	"	3	
22	15	M		50	"	2	
23	5	M		6	"	3	
24	3½	M	1		"	2	
25	12	M	1		"	2	
26	8	M	4		M P L	9	
27	10	M	9	3	S L	9	Ovalate
28	4	F	2	43	L	1	
29	3	M		5	"	1	
30	2	M		40	"	2	
31	35	M	1	12	"	1	
32	45	M	11	30	"	3	
33	5	M	1	12	"	1	
34	45	M	1	20	"	2	
35	45	M	2		"	2	
36	30	M	2	40	"	5	
37	40	M	2	20	"	2	
38	3	M		40	"	1	
39	9	M	1	20	S L	18	Stricture
40	3	M	1	11	L	2	
41	7	M		18	"	2	
42	50	F	14		"	6	
43	30	M	1	15	"	2	
44	60	M	8	20	"	2	
45	3	M	1		"	2	
46	28	F	4	40	"	2	
47	10	M	3		"	1	
48	6	M	3	30	S I	8	Dysentery
49	11	M	5		L	1	
50	50	M	3	40	"	2	
51	9	M		20	"	2	
52	5	M		40	"	1	
53	12	M		36	"	2	
54	3	F		25	"	1	
55	3	M	1		"	2	
56	3½	M		46	"	1	
57	7	M	4	6	S L	51	Wound broke down
58	5	M		35	L	2	
59	7	M	2	30	M P L	10	
60	5	M		46	L	2	
61	5	M	1	20	"	2	
62	10	M	3	50	"	2	
63	8	M	1	15	"	1	
64	40	M	8	30	"	4	
65	3	M		20	"	1	
66	35	M	4	43	"	3	Ovalate

L = Litholapaxy  
M P L = Median perineal litholapaxy  
S L = Suprapubic lithotomy

Column 2—Age is reckoned by the appearance of the individual, as most Indians do not know their exact age

Column 3—The incidence in females in this district is about 10% of the whole.

Column 4—Weights of the stones are correct within a few grains. In the median perineal litholapaxies the stones were probably heavier, a comparatively larger portion being lost in the washings

Column 5—It will be seen that a cutting operation was required in roughly 10% of the total cases

Column 6—Cases were all seen by me on successive mornings after operation and if the urine was clear and the patients were free from any burning sensation, they were allowed to go out at once

### Commentary on Cases

Case 39—A median operation might have been sufficient, but the urethra would only admit a very small sound and a grooved staff could not be passed

Case 48—Attempts to fill the bladder resulted in straining and the child had a motion on the table. It was afterwards discovered that the child had dysentery. The latter cleared up in two days

I can vouch for the accuracy of the above figures, all case sheets having been seen and checked by me personally

The following figures in my possession are interesting, but I am not so sure of their accuracy—

Year	L	M P L	S L	Lateral	Deaths
1910	89	9	1	1	2
1911	94	9	1		3
1912	34	3	1		
(4 months)					
1920	37	2			1
(5 months)					
TOTAL	254	23	3	1	6

The one case of lateral lithotomy I remember well. He was a healthy adult of 45, and I failed to completely crush the stone. Shortly afterwards I opened the bladder supra-pubically and found the stone firmly encysted behind the pubis. Prolonged efforts failed to dislodge it, and he was again sent back to bed. Finally, I was able to plan a "lateral" incision and the man left the hospital cured

The one death in 1920 was in a man of 75. It was a simple case, and he died suddenly four days after the operation. The exact cause of death, in the absence of a post-mortem, could not be ascertained with any degree of certainty and so the cause was put down to the operation

## A Mirror of Hospital Practice.

### NOTES ON A YEAR'S WORK (1923) AT THE U F C MISSION HOSPITAL, KALNA, BURDWAN DISTRICT

By ERSKINE FARAKER, M.R.C.S., L.R.C.P.

THE following notes are based on some 9,000 cases seen and treated during the last

year at the Kalna Mission Hospital. Three hundred and sixty cases were admitted to hospital. The work is almost entirely medical.

The writer took charge in April 1922, when the staff consisted of one passed compounder, a dresser and an Indian "nurse" who could not count above thirty, so that pulse taking was somewhat difficult. It has been a pleasure to see the work develop, we now have 2 European sisters, 4 Indian nurses, 4 passed compounders and 4 student compounders.

Practically no laboratory work has been possible, owing to lack of trained assistance.

*Kala-azar*—Ninety cases were treated in hospital and 200 in the out-patient department.

The aldehyde test was performed in 640 cases. Diagnosis was made in practically every case from clinical symptoms plus the aldehyde test, the two being always considered supplementary to one another.

Injections are given three times a week, but in very weak patients, at the commencement of treatment, I have found it a distinct advantage to give small daily doses of sodium antimony tartrate until the fever has come under control.

The aldehyde test was found to be strongly positive in a few cases other than kala-azar, viz—

1. A case of actinomycosis of the lower ribs, proved by microscopical examination at the School of Tropical Medicine, Calcutta.

2. A case of empyema of the lung which presented almost no lung symptoms, slight fever and a greatly enlarged area of "liver" dulness. The true condition was not suspected for several days.

3. Several cases of cirrhosis of the liver, with ascites in one or two cases, the cirrhosis was of undoubted alcoholic origin.

A fairly robust female patient was admitted to hospital for alveolar abscess, which was subsequently followed by a slight necrosis of the jaw. As she had had low fever for several months she was put on to antimony, but died after 6 weeks from exhaustion. Her blood was negative to the aldehyde test a week before she died, but smears from the spleen, post-mortem, showed Leishman-Donovan bodies.

*Malaria*—Cinchona febrifuge in 15 gr daily doses has been our mainstay and has given most satisfactory results, quinine bihydrochloride intravenously being used in algid cases, and latterly also in milder cases. Personal experience makes me speak very highly of this mode of administration of quinine.

*Helminths*—Oil chenopodium in 15 with carbon tetrachloride in 45 in capsules at night followed by Mag Sulph in the morning has been the routine blunderbuss dose for

all and sundry. It has been effective and I have seen no bad results even though given regularly to debilitated kala-azar patients.

*Fracture-dislocation of the 5th cervical vertebra* due to carrying a load on the head. A patient was admitted who sustained this accident, having slipped whilst carrying a sack of rice on his head. He lived 24 hours, his end being expedited by his friends making him "comfortable" in bed, in spite of warnings to the contrary.

*Syphilitic Pachymeningitis*—K. D., a Christian school-girl, aged 18, was admitted complaining of pain in the left leg. This continued to get worse, after 6 weeks in hospital the patient became unconscious and remained more or less so for 3 weeks. This girl made a perfect recovery with anti-syphilitic treatment.

*Anaphylaxis (to horse serum)*. A case of anaphylaxis after primary injection of serum occurred in an apparent healthy lad of 17 who had been injected with half a dose of anti-venomous snake serum. Immediately after the intravenous injection the patient collapsed. The pulse could not be felt in the groin or axilla for over 3 hours, in spite of liberal injections of stimulants. The patient recovered, but had he received the full dose of serum he would have succumbed.

Death after primary injection of serum is said to occur only about once in a million cases (Sumner, *Brit Med J* 17-3-13). This lad was given anti-venomous snake serum as a precaution, as he said that he had been "bitten by something" in the dark, on the foot, 25 minutes previous to injection. No mark was visible and no symptoms of venom intoxication developed.

#### A CASE OF LOCAL TETANUS

By J. PEREIRA,

Assistant Surgeon, G. I. P. Ry. Kalan.

SHANKAR MADAR Hindu, aged 24, came to hospital on 17-12-23 complaining of spasmodic pain in the right leg shooting from the calf upwards. The spasm was caused by pressure on the calf. He gave a history of a wound on the dorsum of the same foot about four months previously. It was treated at the Civil Hospital and got well in fifteen days, when the spasm simultaneously and slowly developed. It steadily increased and about the 12th of December it was so great that he was not able to walk.

He was brought to the hospital on 17-12-23 and on examination the knee-jerks were normal and there was no lock-jaw. The pulse was normal and there was no fever. On pressing the right calf the patient was thrown into a spasm, throwing his head backwards to the ground.

I admitted him into hospital and gave him 1,500 units of tetanus antitoxin on the 19th



The patient slept better that night. The next day I gave him another 1,500 units and the following day the patient began to walk about and felt very much better, pressure on the calf on this day was not accompanied with any distinct spasm.

On the 25th I gave him another 1,500 units, and he was discharged cured on the 31st.

This is a very atypical case of tetanus and I shall be glad if any of your readers could quote similar examples. The interesting features of this case are —

1 There was no lock-jaw and no exaggeration of the knee-jerks.

2 Only 4,500 units of tetanus antitoxin were sufficient for cure.

#### A CASE OF PARATYPHOID B

B. W. W. JEUDWINE,  
LIEUT.-COLONEL, I.M.S.,  
Civil Surgeon, Simla, W.

A GIRL E. L., age 9 years, was taken ill on November 1st with headache and fever.

*Previous history*—Primarily quite well and at school.

*Family history*—Two sisters, both at the same school, had lately had attacks of fever with constipation. The mother says that they often get "bilious attacks."

malaria was negative. Blood culture taken gave a growth of *B. Paratyphoid "B"*. The progress of the case was uneventful and the total period of the illness short, 16 days in all.

The peculiarities of the case are —

(1) Two sisters having similar attacks of fever with constipation lasting for about seven days.

(2) The high temperature in this case.

(3) The rapidity of the fall of temperature and convalescence.

The treatment consisted only of control of the vomiting by alkalies, clearing out the bowels by enemata, giving only barley water, whey and chicken soup for food.

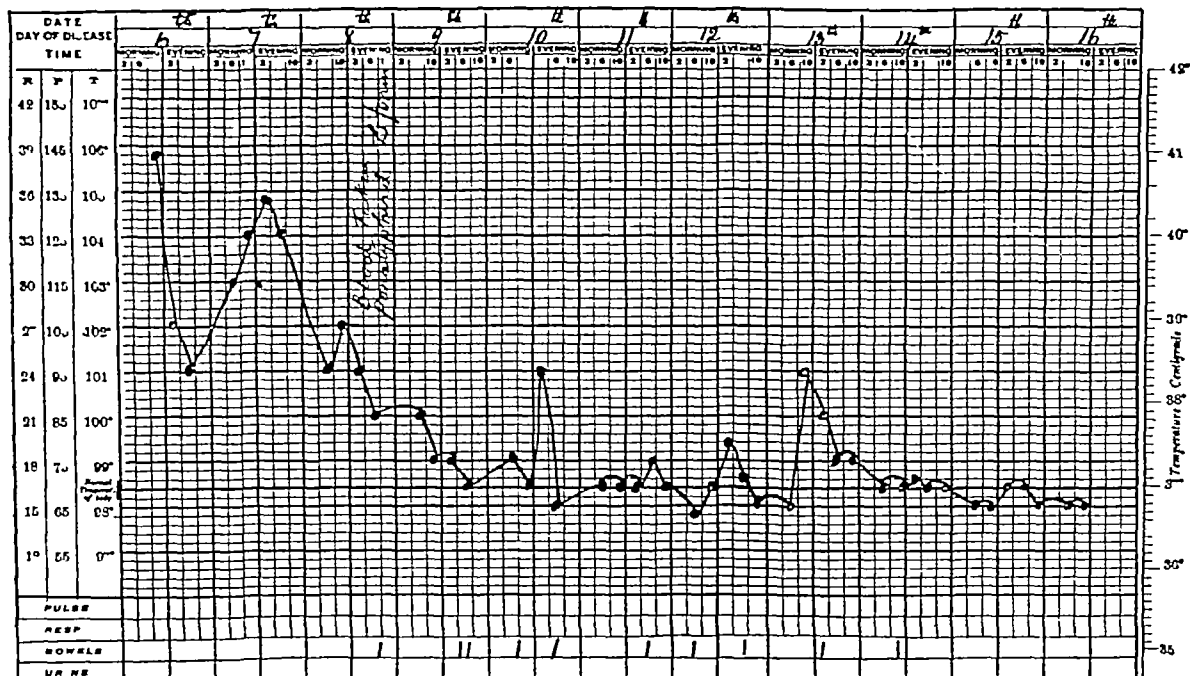
It may be that many so-called "bilious attacks" with pyrexia and constipation are due to toxic absorption from a paratyphoid group organism.

#### A CASE OF ANAPHYLAXIS

B. NAGENDRA NATH DE, M.B. (Cal.),

House Physician, Medical College Hospital, Calcutta

A R., a boy of 7 years, had tetanus in 1919, which developed on the 17th day after infection, and was cured by 4 injections of



The child was seen by me on the 8th day of illness on account of the high temperature. She had been treated with aperient medicines and an enema had been given as she was very constipated. She was constantly vomiting bile and could not keep anything down.

*Present condition*—When seen, the child looked flushed, was rather drowsy, and complained of headache. Physical signs of any disease totally absent. Blood taken for

anti-tetanic serum and 25 injections of carbolic acid.

On May 3rd, 1923, he received a lacerated wound of the left ankle from a fall on the ground while playing football. I was consulted by his parents the next day with a view to preventing any possible onset of tetanus.

As nothing is known definitely about the duration of the acquired immunity against



tetanus (if any such thing ever exists), I told them that the mode of prevention lies in the injection of a prophylactic dose of anti-tetanic serum and at the same time explained to them the possibilities and dangers of anaphylaxis. They insisted on the prophylactic dose as they had been so much frightened by the last attack of the disease. I gave the boy a drachm of calu lactas in 24 hours and a subcutaneous injection of adinalin 0.3 cc (P. D. & Co.) at 6.45 p.m. next evening. I next injected  $3\frac{1}{2}$  minims (0.2 cc) of anti-tetanic serum subcutaneously in the left thigh at 7 p.m. In one and a half minutes the patient who was seated on his bed closed his eyes drowsily. The next moment he was going to fall down and was laid on the bed. He responded sleepily to the next call but in the course of three minutes the coma became so deep that he could not be roused by any means. The pulse which was 85 per minute rose to 100 per minute and the blood pressure came down from 90 to 85 mm. of mercury. The boy remained in exactly the same state for 45 minutes and then began to show signs of regaining consciousness. He answered questions semi-consciously and tossed a few times on his bed seeming to feel restless. He had no convulsions throughout the period. In about 30 minutes more he began to talk and could sit up in bed. He slept well the rest of the night and was perfectly well the next morning. No more injections were tried on him.

Points of interest in the case are —

1 The presence of hyper-sensitiveness four years after the initial injections

2 No appreciable effect of adrenalin in prevention of the anaphylactic shock

3 The comatose nature of the shock without a single convulsion

4 The nervous phenomena more marked than were the vascular phenomena

### SYPHILITIC GRANULOMATA OF THE UTERUS AND APPENDAGES IN A CHILD OF 8 YEARS

By F. R. PARAKH, M.D., M.R.C.S.

*Consulting Surgeon to the Surat General Hospital, Consulting Surgeon to the Tata Nargol Hospital, Late Hon. Obstet. and Gynaecol. Surgeon to the Petit Parsee General Hospital etc., The Parakh Hospital, Khetwadi, Bombay*

THE object of contributing these notes is the rarity of the above mentioned condition, especially in one so young and innocent.

This was a case referred to me by a medical colleague who had treated it for some months without success. On examination the little patient was of normal build and weight. She was complaining of severe pain in the lower abdomen with vomiting and rise of fever to about  $103^{\circ}\text{F}$ . This was not her first attack as she had had similar ones three or four times before.

On examination, her respiratory and urinary systems were normal, and no history of syphilis or tuberculosis could be obtained. Abdominal palpation revealed a distinct mass in the right iliac fossa, painful and tender. The liver and spleen were normal, and no other glands were enlarged anywhere else in the body. There was no history of chronic constipation or of rectal irregularity. The patient was kept under observation for a couple of days, during which time the temperature came down to normal, but the pain and vomiting remained. I made a provisional diagnosis of tubercular cæcum, and decided to remove it. On making a right rectal incision and opening the peritoneum, a thin yellowish fluid escaped, which was collected for examination the result of which was negative. On proceeding with the operation, instead of the cæcum being the most affected the uterus, ovaries and tubes were found diseased. This mass was strongly adherent to the sides of the pelvis, and very soft in nature any attempt to apply forceps or a ligature breaking the tissues at once and profuse hæmorrhage resulting. A desperate attempt was made however, and the mass removed, the whole abdomen being a pool of blood. This was hurriedly wiped out and the pelvis packed with hot saline swabs one over the other. These were left behind and the abdomen closed in the usual way leaving the lower half of the wound open. The patient was removed to her bed with a pulse of 160 and respiration rate of 55. Hæmoplastin was administered every four hours and her general health kept up. Twenty-four hours later the pulse dropped to 110 and the little patient was well on the way towards rallying from the shock. On the fourth day, under light anaesthesia, the abdominal packing was gently removed, the wound soaked in hot saline without causing any hæmorrhage and the incision closed up with a drainage tube at its lower end. The patient henceforth made an uninterrupted recovery and was discharged on the 22nd day with a small sinus.

The growth was examined at the Government Laboratory and was reported as "granulomatous growth, probably of a syphilitic nature."

The following points deserve attention —

(a) The excessive friability of the growth rendering it practically impossible of removal, except by the heroic and extemporaneous method employed.

(b) An extremely rare case of a congenital syphilitic growth, not only of the uterus but the tubes and ovaries as well, in a child of 8.

(c) No involvement of any of the other organs or lymphatic glands anywhere else in the body, nor any other signs of congenital syphilis.

[The diagnosis appears to be doubtful—ED. I. M. G.]

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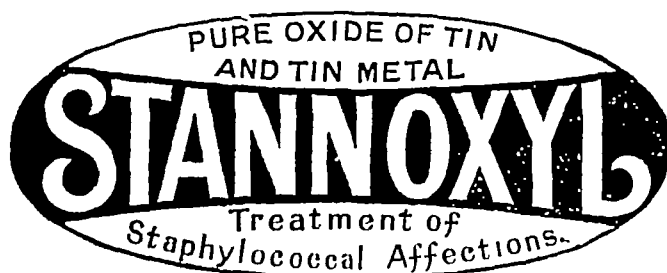
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# Indian Medical Gazette.

APRIL

## THE ROCKEFELLER FOUNDATION

THE annual report of the Rockefeller Foundation for 1922 forms a fascinating record of what can be accomplished by the co-operation of experts and wealthy philanthropists.

In 1909, Mr. John D. Rockefeller organised and financed the Rockefeller Commission for the eradication of hookworm disease at a cost for five years' working of one million dollars. Work was confined to the Southern United States and as a result of the operations of the Commission a general knowledge of the prevalence and prevention of the disease was created among the physicians and public so that the chief purpose of the Commission was regarded as having been accomplished.

In May 1913, the Rockefeller Foundation was endowed by its founder with a sum of one hundred million dollars and the International Health Commission was created "to extend to other countries the work of eradicating hookworm disease and to establish agencies for the promotion of public sanitation and the spread of the knowledge of scientific medicine."

During the ten years' existence of the Board hookworm infection has been measurably diminished progress has been made towards reducing the ravages of malaria, and a relentless campaign has been waged with great success against yellow fever.

The Board has always worked on the understanding that public health is essentially a function of the government of each country, and its aim has been to awaken public opinion and to encourage the formation of permanent agencies for public health work by demonstration of the value of organised effort and by suggesting programmes of effort. It has also striven to supply an adequate number of skilled public health officers and to aid research in cases where it is likely to lead to the more effective application of existing knowledge to the control of disease.

Yellow fever has been brought under control to such an extent that it now lurks only in a few isolated localities. Experiments in the control of malaria have shown that it is possible to bring the disease under effective control in certain areas in the United States at a cost which varies from less than two rupees a head to a little more than three rupees a head. Even in poverty-stricken India, such results, if attainable

would add enormously to the efficiency and well being of the population. The despised quinine prophylaxis has resulted in a diminution of the disease by as much as 80 per cent in certain communities.

Hookworm control has yielded very striking direct results, the percentage of infected persons being reduced in one place from 63 per cent in 1913 to 93 per cent, and in all other localities very striking reductions have been obtained. The indirect results of the anti-hookworm campaign are even more valuable, the interest which has been aroused by the operations of the anti-hookworm organisations has resulted in a great increase in the efficiency of public health work in general and a great diminution has resulted in such diseases as typhoid fever and dysentery.

Contrary to the pessimistic prognostications of certain workers, it has been shown that mass treatment causes a great reduction in soil infection.

A fundamental rule of the Health Board is that it refuses to interfere with the policy or details of administration of public health in any country. The Board helps by the supply of men and money, but the disposal of these is entirely in the hands of the government concerned.

Some idea of the scope of its operations in the matter of medical education may be mentioned to show the scope of its operations —

"The Foundation's programme during 1922 included an agreement to contribute \$1,125,000 toward the building project of the State University of Iowa, contributions to the maintenance funds of the medical schools of the Université de Montreal and the University of Alberta, Canada, completion and maintenance of Peking Union Medical College, annual gifts to the medical schools of Shantung Christian University, Yale-in-China, and St John's University, Shanghai, the endowment of chairs of medicine and of surgery in Hongkong University Medical School, an agreement to assist the Siamese government to reorganize its medical school in Bangkok, a similar proposal to the medical school of São Paulo Brazil, the lending of expert administrators or teachers to the São Paulo school as well as to Peking Union Medical College, the University of the Philippines and the medical school of Salvador. Besides all this, surveys of medical schools were made in Austria, Czecho-Slovakia, Germany, Hungary, Poland and Switzerland.

In addition to the twelve schools mentioned in the first paragraph of this section, the Foundation has during recent years made substantial contributions to eight others. The Free University of Brussels is receiving three

the last year for which figures are available in the Public Health Commissioner's Annual Reports

Cholera	450,608
Small-pox	40,446
Plague	69,682
Dysentery and diarrhoea	229,576
Respiratory diseases	334,103
Fevers	4,761,237
All other causes	1,499,460

Of definitely epidemic disease excluding malaria there is therefore a total recorded deaths of about 600,000, another 200,000 for dysentery and diarrhoea and some 300,000 for respiratory diseases, or a total for all these causes of something over 1,000,000 out of the 7,000,000 total deaths. Compared with this is the colossal figure of nearly 5,000,000 deaths from fever.

As you know, much speculation exists as to the proportion of the fever deaths that can be ascribed to malaria. The data from a recent attempt to arrive at a solution of this problem in the different provinces are given in the last report of the Public Health Commissioner. These data do not greatly modify the delegation of a vast total to malaria, the totals are as follows

Enteric	47,822
Measles	11,738
Relapsing fever	7,752
Kala-azar	1,887
Other fevers	739,989
Malaria	1,852,391
Total	2,661,379

About 70 per cent of the total is still here returned as due to malaria. Lt-Col Leslie in his presidential address at the Imperial Malaria Conference at Simla in 1909 makes an estimate from special enquiries, dispensary reports and other sources that about one-fourth of the total fever deaths are due to malaria. At present I do not think any estimate can be formed as to the part played by malaria in the causation of mortality in India. It is a subject of very great importance the discussion of which must be left to some future occasion. It seems pretty certain, however, that the term "fever" is merely a great residuum of undiagnosed causes of death and for the present we must leave it at that. We have no knowledge at all what proportion is actually due directly or indirectly to malaria, nor even by what types of death in such a vast population malaria exhibits such mortality as it may cause. That malaria is the most important cause of mortality in India is scarcely to be doubted and it is much to be deplored that we know so little about this important aspect of malaria.

Regarding these recorded deaths from epidemic disease there are very important points to be considered before we can say that the figures really represent the full effect of epidemic disease on the total mortality. Attempts have been made in several directions to gain more information as to the true causes of death in India. Increased accuracy of registration of the cause of death is one of these. Another is the verification by sample observations of the actual causes of death in particular areas. I shall not enter into a discussion of these methods which belong more especially to the province of sanitary science, but shall take a more general scientific view of the matter.

Not infrequently one hears disparaging remarks about the accuracy of Indian death statistics. The important matter is, however, not to confuse two entirely distinct things, namely, the return of death as such and the return of the supposed cause of death. The cause of death is a matter of opinion and it will still remain largely a matter of opinion even when death certificates are signed by medical men, unless they are verified by post-mortem, and even then

secondary causes might be given which were not entirely or primarily concerned. In the fact of death, however, we pass beyond opinion to exact observation however ignorant the recorder may be, and it is to the record of the fact of death in India that for the present we must turn in all critical work on the effect of disease on mortality. This is a most important consideration not sufficiently realised in the study of Indian statistics.

As the massed records from a huge country necessarily mask by the multiplicity of conditions involved much that is plainly seen when dealing with records from smaller areas, it is usually necessary to obtain any results of value, to study separately the returns from comparatively small units. Suppose then, as in making a temperature chart, we plot the monthly number of total deaths for some registration unit over a period of some years. We shall then get the kind of chart I am shewing on the screen. We may call such a chart a *thanatograph* from the Greek *thanatos* death and *γραφω*, I write. You will see that we have a tracing such as science has frequently to unravel, a tracing remember based on observations as reliable as those in most scientific experiments, for we are concerned only with the fact of death and with no one's opinion as to the cause of death. The curve may be likened very aptly to a seismographic tracing. It is like a seismographic record too in that it shews every now and again violent oscillations comparable to records of earthquakes. Looking at the thanatograph we shall see, unless the earthquake shocks are too frequent, that there is a varying but more or less constant number of deaths over considerable periods, but that this even course is now and again disturbed by sudden rises in the graph. These rises are the effects of epidemics usually zymonic in character. Clearly each rise tells us the number of deaths due directly and indirectly to the influence of the epidemic causing the rise.

Now it is a most important fact that you will not find in the statistics enough deaths recorded under any epidemic disease at such times to account for, or nearly to account for any of these rises. All that you may find is a number of deaths recorded from some epidemic disease that may give you the clue to the interpretation of the total death curve. Frequently it is only from the towns, headquarter *tahsils*, or places where there are dispensaries, etc., that any deaths are recorded as due to this particular epidemic disease concerned. Yet even such information is not always necessary to enable us to interpret the curve. Looking at the rises you will see that they differ in height and in shape, some are short sharp stabs, others long drawn out mounds and every now and then you may see a characteristic truncated cone. Again you will find that each kind of rise has a very strict relation to the time of year. The truncated cones, for example, which are caused by epidemic malaria invariably commence in September and end in December. The short stabs in July or August in the particular part of India now referred to are due to cholera. By the characters of its curve and the time of its occurrence many of the epidemic diseases write their records so unmistakably that with due knowledge it is possible to read from the curve of total deaths what is happening, even if we have no other statistics.

The height to which the rises extend usually depends on the position our special area occupies in regard to the zymonic disturbance causing the rise. If we were to prepare and examine the thanatographs of a large number of registration units lying near one of these death storms we should find that practically all shewed simultaneous rises, but whilst in some that lay in the outskirts of the storm the rises would be insignificant, in those situated towards the zymonic centre the rises would be much greater, the death-rate being sometimes 10, 20 or even 30 times the normal.

What the proportion of the total death-rate in India—the death-rate from epidemic disease—may be

I cannot say, but it must be very much greater than the recorded deaths from epidemic disease would indicate

Summarising then, we can say that one cause of the high Indian death-rate is the prevalence of zymotic manifestations of epidemic diseases. In this the conditions in India differ from the present conditions in Europe, where, except under very unusual circumstances such a form of disease prevalence does not now occur

Almost coming under the phase of zymoses were the famines that once decimated tracts in India. Fortunately these no longer figure on our list as direct causes of mortality

### *Endemic disease*

Increased liability to death from epidemic disease, though it is an important, perhaps the most important cause of the high Indian death-rate and small expectation of life, is by no means the only reason for this phenomenon. India being a tropical country not only suffers from some of the most serious diseases of temperate climates such as tuberculosis, but has a long list of infective diseases special to the tropics. Of such diseases we may mention ancylostomiasis, filariasis, leprosy, dysentery, and so on. Certain non-infectious diseases are also peculiarly prevalent in India such as various deficiency diseases, diabetes, etc. In the aggregate, the number and variety of these causes of death must be very serious and liability to them is part of the reason for a shortened expectation of life. There is still a great deal to be done in the investigation of such forms of disease, the importance of which is only second to that of the great epidemic diseases

### *Sickness*

So far we have spoken only of death measuring disease in proportion to the number of deaths it has caused. But not only is every epidemic responsible for sickness as well as death but there are many causes of sickness that we have not so far included in the causes of death. In the aggregate the amount of misery from various sicknesses and the amount of incapacity from various minor forms of disease in an ordinary Indian community is extremely great. I have seen the whole of the inhabitants of a small remote village covered with suppurating sores from itch from which disease they had no means of escape. The number of eye infections and blindness from various causes must strike every medical man visiting the villages. In the streets of Madras and no doubt other towns in the South of India you may see any day half a dozen cases of elephantiasis. Skin infections are a great cause of misery. Of great importance is the role of such diseases as malaria and ancylostomiasis in causing anemia. In the examination of a number of adults not obviously suffering from disease and on the active list of workers on a large mine I found the percentage of hemoglobin only about 70 per cent of the normal and such a degree of reduction I suspect is not at all unusual in Indian communities. The fact that some 50 per cent at least of the whole population of Southern India harbour a certain amount of ancylostome infection whilst some 25 per cent show micro-filariae in the blood are important facts

That so much sickness must be paid for in some form, either by loss to the individual or in loss to the community, is clear. What the amount so to speak to put in the bill may be is, however, very difficult to estimate. In a community of selected healthy adults such as the Indian troops the admissions to hospital for sickness in proportion to deaths as shewn in the statistics for the five-yearly period 1915-19 is about 50 to 1, whilst the proportion of constantly sick to deaths is about 2 to 1. For 1 000 000 deaths representing in round figures the annual deaths among adult males of 15-50 years of age in the general population, there should be on the above basis at least 2 million constantly sick and the equivalent of 50 million admissions to

hospital. We know from the census returns that there are in India at least 80,000 insane, 200,000 deaf mutes, 500,000 totally blind and 130,000 lepers sufficiently pronounced to be returned as such

All this is very difficult to put down in terms of wages lost by the individual or wasted to the community but it is nevertheless a payment definitely made by India

### *The Economic and Financial aspect of disease*

So far we have dealt only with disease from the point of view of the person affected or his family or others dependent on him. There is, however, an outlook which may be called the economic in which Government especially may be expected to be concerned, and another view, the financial, in which both Government and various other bodies are concerned. We may briefly consider one or two obvious points in this connection

### *Increase and decrease of population*

In the decade 1901-1911 the net increase of the total population of India was 64 per cent, in the decade 1911-21 it was 12 per cent. But whilst these figures represent at least some increase for India as a whole, examination of the data for particular areas shews that whilst some areas have shewn an increase others have not only not increased but have shewn a decrease. e.g., the United Provinces which for some 49,000,000 inhabitants shewed a decrease of 11 per cent in 1901-11 and a decrease of 35 per cent in the last decade. Again in the Punjab which shewed in 1901-11 a general increase of about 5 per cent a population of about 13,000,000 occupying an aggregate area of 32,000 square miles had not increased but decreased by 97 per cent

A decrease of this kind in a population like that of India is an ominous sign. There is no question of its being due to a lessened birth-rate as it might be in a more sophisticated population, nor is it due to emigration on such a scale and it must therefore be due to an excessive death-rate. But an excessive death-rate is not an isolated phenomenon and to every death there has been an equivalent amount of sickness interfering with the normal life of families preventing the people tilling the ground or collecting the harvests or tending the cattle on which the welfare of the rural population depends and so forth. It must inevitably mean loss of revenue, loss of general effectiveness of such populations and the deterioration of the resources of the affected areas. The cost of such deterioration could no doubt be assessed but apart from this it is due to the population so affected that they should as far as possible be preserved from such results, and at this, I think, we must leave the matter

### *Agricultural advance*

In a country like India no single factor in its prosperity can be so important as the increase of locally grown food supply. Such increase is brought about by improved methods of agriculture but also by bringing new areas under cultivation. The latter method in particular is peculiarly dependent on the absence of serious prevalence of disease. In the great Canal Colonies a serious menace is the malaria that is normally induced as a result of irrigation. At first relatively healthy, such areas are liable to an increasing malarial endemicity that, if it does not altogether nullify the good such schemes bring at least detracts largely from this

In efforts to open up new areas of cultivation again disease may often be the factor determining success or the reverse. In Assam, I had the opportunity some years ago of examining a newly opened experimental project for the growing of sugarcane on a large scale. There exists along the foot of the Himalayas in these parts a broad belt of grassland many hundreds of square miles in extent almost uninhabited and entirely unexploited. The soil and other conditions agriculturally were said to be favourable and the whole question of the commercial value of utilising the land could



be seen to turn upon the prevalence of malaria. When I saw this experimental estate it called to my mind accounts one reads of the operations in the far west. The ground covered with tall elephant grass was ploughed, elephant grass and all, by huge steam tractor ploughs. If a tree grew where it was not required it was pulled up by the roots by the powerful machinery. Whether this venture will be a success and add a new industry to Assam will be a matter of whether man or the malaria parasite wins the day.

#### *Industrial expansion*

Next to the production of food supply in importance to India is the expansion of her industries. Industrial success is largely bound up in the maintenance of effective labour forces, and the factor which determines the satisfactory maintenance of a labour force more than any other is the prevalence of disease. It is the aim of industrial concerns to have a labour force living happily on or near the estate. Very often on account of disease such communities have to be maintained by constant recruitment. The children die, the adults except such as weather the storm and become old immune hands, suffer from fever and malaria and the mental consequences of such a state and the net result is disease and a deficient and ineffective labour force. In such industries also as employ mill-hands the influence of disease must be ever present reducing efficiency, increasing the cost of wages and limiting profits. We may say that in the matter of industry disease is not only a tax, but to some unknown extent, depending on the industry concerned a limiting factor to its full and useful development.

#### *Public Administration and Trade*

Not inconsiderable must be the loss to India of increased salaries paid because the world's market fixes its own rates for life endangered by disease, increased expenditure from invaliding, shortened service and increased leave that the world also demands as its price for exposure to disease. Worse still must be the money paid for ineffective service of subordinates liable to frequent sickness or definitely on the sick list. Here should be added also the cost of maintaining the sick, of supplying drugs, of the upkeep of hospitals, lunatic and leper asylums and so on.

As regards the effect on trade a very little experience shows one the effects of disease in limiting and making more expensive all forms of commercial activity. Latterly in Bombay there has been a very ominous increase of malaria in the city itself. Should such conditions increase, as they well may do in one way or another, almost imperceptibly perhaps, but every day and in every way, to parody a popular phrase, malaria must oust in the long run human activity, until in place of a once active and prosperous commercial community there will remain but a pallid remnant dragging out an existence of temporary exile in a decayed tropical metropolis—like the dreams in some Wellsian romance.

A point of some importance is what a country pays for a bad sanitary reputation. Such a country is apt to be mulcted by health restrictions, sanitary regulations and quarantine applied to its shipping and ports, all entailing delay to commerce and perhaps even directing trade elsewhere. Shipping firms have to maintain agents and to pay them in accordance with the sanitary reputation of the country. Firms have to do the same. All must ultimately be paid for by increased cost of necessities to the country concerned. A recent bulletin gives the value of India's annual imports as over 200 crores of rupees and that of her exports as about 300 crores. A very small *ad valorem* percentage as a result of such influences as we have indicated would very soon run into crores. This is a modest statement of the case against disease in India. The cost I cannot pretend to put into figures. All I can say is that the tribute paid to disease in a country like India is one of importance economically,

even politically, and one that has many financial and commercial aspects. It however transcends this in being of importance to the welfare of 360 million human beings who by their tacit acceptance of such calls as may be made upon them signify their belief that they are being governed to the best ability of those responsible for such government. The important matter therefore seems to be that proper and enlightened views should be held by Government as to the steps to be taken to justify that trust in so far as the prevention and amelioration of disease is concerned.

But no Government however enlightened can combat disease without knowledge and were they prepared to lay out vast sums on the public health their efforts would be nugatory without the contributions of medical research. Both sanitation and medical relief are based on the findings of medical research and are powerless to advance except as a result of advances in the branches of science dealing with disease. The vastness of the problems at issue should not be ignored. It is no question of applying such knowledge only as we now have nor of purchasing the necessary knowledge from Europe. Europe cannot help, for her problems are different and she knows nothing of India's requirements. Only by the encouragement of research in her own territories can India arrive at a proper basis for effectively combating the many diseases that affect her populations, and it is the duty of an enlightened Government to allocate a due proportion of her revenues to this purpose.

There are many aspects of medical research and the proper proportioning of the activities of a department responsible for such research is a problem in itself. Highly technical studies are necessary as well as more obviously utilitarian activities. What is important is that those concerned in research should be inspired by the flame of active endeavour. Things have so worked out that latterly much of the medical research work in India has been fostered and financed by the Indian Research Fund Association. Experience has shown that such an organisation works well and with the recently instituted meeting of research workers to voice the views of those actually carrying on the work a most useful directing force is assured. A good deal has been heard lately of the control of research, but what is needed now is not so much the prevention of some possible overlapping of researches, a matter of little moment but a greater volume of good class work and especially of sustained research work on some of the major diseases of India.

## Current Topics.

### The Remote Results of Malaria

(*Jl. Ind. Med. Assoc.*, Nov. 17, 1923, pp. 1703)

At the Seventeenth French Congress of Medicine which was held at Bordeaux, September 27-29, 1923, Dr. Le Dantec, professor of tropical diseases at the Faculté de Médecine of Bordeaux, dealt with the remote effects of malaria on the circulatory apparatus, and the influence of malaria on the mother and child. The peripheral arteries may be affected by malaria. Dry gangrene from obliteration of arteries is not rare in some parts of the body, especially in the extremities, the face or the genital organs.

In women, malaria exerts a harmful influence on fecundation, pregnancy and childbirth. In malarial districts there are more sterile women than in more healthful climates. Pregnancy may not only precipitate but also may modify an attack of malaria. Pregnancy, when associated with malaria, often ends in abortion or premature labour. The period following childbirth is always marked by the return of malaria. The fever usually appears about the third day after childbirth, malarial

attacks can be distinguished from puerperal fever by the fact that the former come on more commonly in the morning. In case of doubt, quinine should be administered as it has also a favourable influence on puerperal septicaemia. Children born at term, of a malarial mother, are poorly developed and have a tendency to rickets. When the mother is suffering from malarial cachexia, the mortality among the new-born is 75 per cent.

Sequels of malaria with definite lesions that are not influenced by quinine, do not respond to any specific treatment. This is not true of lesions that are still active, such as are encountered in colonial officials, planters and in the native population. Here specific treatment is strongly indicated and comprises preventive and curative cinchonization. The former consists in the daily administration of from 0.2 to 0.3 gm. of quinine sulphate or hydrochloride. This may be continued for many years without inconvenience to the digestive tract or to the renal passages. In recent malaria, purely schizogenous, a radical cure may be effected by intensive treatment extending over several weeks. On the other hand in cases of longer duration, gametogenic malaria, the treatment should be continued for two months or longer.

Dr. Hesnard, professor at the school of naval medicine at Bordeaux, discussed the remote effects of malaria from the neuropsychiatric point of view. Persistent nervous disturbances of malaria are encountered in subjects who have suffered rather severe attacks. However the gravity of the disturbances is not always proportional to the severity of the infection that gave rise to them. For instance, a grave psychosis may follow a mild case of malaria, in which only parasites of a benign type are present. As remote sequels of a psychiatric character, one observes (1) tardy mental complications in subjects with frank predisposition, (2) mental sequels (arrest of mental development, malarial infantilism, mental debility, etc.), (3) chronic insanities, continuous or intermittent, precipitated by the malaria in subjects constitutionally predisposed, more particularly attacks of manic-depressive insanity and certain types of catatonic dementia praecox.

These papers gave rise to an interesting discussion, during which Professor Sabrazes of Bordeaux reported four cases of encephalomeningeal sequels of malaria. He emphasized the importance of laboratory researches, more particularly the cytologic and chemical examination of the cerebrospinal fluid to determine the nature of nervous accidents of malarial origin. Dr. Porot of Algiers stated that in children, owing to the greater vulnerability of brain tissues, permanent sequels are more frequent when the malaria occurs during the first two years of life: (1) hemorrhages into the cortex or a focal lesion causing slight encephalopathic syndromes (mental backwardness or idiocy, with or without epilepsy and with or without diplegia), (2) dystrophic states of ordinary infantilism with retarded physical development, and (3) much less frequently, by an elective endocrine lesion, infantilism of the special mixedemur-tous type.

### Tomarkin's "Antimicrobium"

*Lancet*, Dec 15, 1923, pp 1310

SOME rather remarkable statistics have recently been published in Italy on the results of treatment of acute pneumonia by "antimicrobium" which has a definite composition indicated by the name amino-orthobenzoylethylsulpho-isoamyl-o-hydroxypro-nuclein-formate of soda. Twenty-five cases of pneumonia, chiefly lobar, treated in the San-Spirito Hospital at Rome during March, April and May by antimicrobium, gave a mortality of only 4 per cent, whereas 50 patients treated during the same period with the usual symptomatic treatment showed a mortality of 40 per cent. In other wards of the same hospital the mortality was 55 per cent. and 38 per cent. with the usual symptomatic treatment. The drug appears to have been well tolerated in all cases, and its effect is explained as a combination of antitoxic and anti-

pyrogenous action causing a biological transformation of the products of bacterial scission (endotoxins) and decomposing the bacterial toxins by precipitating the nucleo-albumin and altering their physical and biochemical properties so as to render them easily eliminable. It has, moreover, a marked phagocytic action, causing hyperleucocytosis of preponderating mononuclear type, thus mobilising the defensive bodies of the organism.

### A New Treatment for Sprue

(*Trans. Royal Soc. Trop. Med. and Hyg.*, Oct 18, 1923, pp 273)

IN the *Lancet* of 20th October, 1923, Dr. H. Harold Scott records good results in a small series of cases of sprue treated with calcium lactate and parathyroid extract. He points out that sprue occurs endemically in countries where there is an excess either of proteins or of fats in the diet. Excess of proteins leads to an acid dyspepsia, excess of acid in the duodenum stimulates secretion, this leads to over-stimulation of the pancreas and disturbs the balance of other endocrine glands, amongst them the parathyroids.

Excessively fatty diet, combined with monotony of the food, leads to a lowering of digestive activity and hence to fermentation, catarrh, acid dyspepsia, and intestinal toxemia. In this case, as in the case of a diet with excess of proteins, there is a deleterious effect on the parathyroids, which control calcium metabolism and are concerned with detoxication.

Scott gives calcium lactate in 10-gram doses in cachet thrice daily, increasing the dose later, if necessary, to 15 grams thrice a day. Parathyroid extract is given in doses of 1/10 gram twice daily, the quantity being reduced as the patient improves.

Several cases of cure are reported. This treatment is well worth trying. Experience will soon tell us whether the theory on which it rests has a sound foundation.

### Anæsthetics from the Surgeon's Point of View

By WILFRED TROTTER, M.S. F.R.C.S.

Surgeon University College Hospital, London  
(*Brit. Med. J.* Nov 3 1923, pp 791)

#### INHALATION METHODS

*Ether* is the nearest approach we possess to an anæsthetic of general use, and if one were limited to a single form of anæsthesia the inhalation of ether would undoubtedly have to be chosen. It has many serious drawbacks. The stimulating effect of the drug is such as to overdrive the circulatory and respiratory activities of the patient throughout the administration and thus to add seriously to the exhausting effect of the operation. It is notoriously irritating to the respiratory organs and the stomach and thus frequently leads to coughing, and usually to vomiting in the immediately post-operative period.

The advantages of ether are ease of administration, unimmaculate safety, and profundity of anæsthesia. It is seen at its best in operations of moderate length and severity, when it can safely be preceded by narcotic drugs, and in operations where the wound will not cause vomiting to be painful, respiration to be shallow, or coughing ineffective.

*Chloroform* is probably at the present time less used and in less estimation as an anæsthetic than it has ever been. But it still has uses for which no effective substitute has been found.

The numerous disadvantages of chloroform include its immediate danger, the relative lack of depth in the anæsthesia it produces, its not inconsiderable irritant effects on respiratory and gastric mucous membranes, and, above all, its capacity to produce the so-called delayed chloroform poisoning.

Over against these must be set its power to produce in suitable cases a smooth and placid anæsthesia.

unconfused by the artificial and exhausting floridity of the other patient, and allowing the surgeon at any moment to estimate the actual state of affairs, its special suitability for use in the aged, its usefulness in cases where any increased turgescence of the respiratory tract is inadmissible, and its almost absolute safety when given through a laryngotomy or tracheotomy opening.

On account of its immediate dangers chloroform is absolutely inadmissible in infants and children in all circumstances, it should never be used for trivial operations, and what may be called casual anaesthetics, and it should not be used for robust and young or middle-aged adults unless called for by some very special indication.

On account of its liability to produce delayed poisoning, chloroform should never be used in young people suffering from acute or chronic infections, in patients suffering from malnutrition or starvation, or in diabetics.

On account of its relatively shallow anaesthesia and the liability of post-operative vomiting, when it occurs, to be persistent, chloroform is not usually admissible in serious abdominal work.

In Mr Trotter's practice chloroform is used in all mouth, jaw, larynx, and pharynx cases almost invariably in combination with laryngotomy or tracheotomy. He has never seen the least cause for anxiety in a series of many hundreds of cases of this type after the wind-pipe has been opened, though he has known an unaccustomed anaesthetist to be a good deal disturbed by the periodic respiration with long apnoeic pauses that usually sets in in elderly patients after tracheal breathing has been established. Chloroform is also used for a large number of the brain and spine operations and for the radical operation for breast cancer.

It is only in delicate or enfeeble patients that gas can be relied upon by itself to produce a steady and adequate anaesthesia. It will usually be necessary to supplement it by the local or regional anaesthetization of the part to be operated upon. The efficiency of the method is increased by the use of narcotics. The procedure in outline is, in order (1) a hypodermic injection of morphine hourly for the three hours preceding the operation, (2) nitrous oxide administration, (3) regional or local anaesthetic injection. Any but the most extensive abdominal operations can usually in suitable cases be done under this anaesthetic régime with complete success. The addition of small amounts of ether vapour to the inhaled gas, as is well known, extends the applicability of the method to many patients in whom it would otherwise be impossible. This addition, however, brings with it the risk of sacrificing the chief advantage of the procedure by inducing post-operative vomiting, so that an effort to avoid it is always made in the author's practice, even at the cost of some inconvenience to the surgeon.

Spinal anaesthesia is not suitable for enfeebled patients or for those with acute and serious abdominal conditions. It is a grave mistake to suppose that it is a possible substitute for inhalation methods when these are thought to be inadmissible on account of cardiac or vascular diseases. Its special usefulness is for operations on the lower limbs, perineum, pelvis, and lower abdomen where shock is greatly to be feared (amputation high in the lower limb), where metabolic complications are to be avoided (diabetic gangrene), and where full abdominal relaxation is essential (large abdominal herniae in fat subjects). It should generally be preceded by narcotic drugs and may often be usefully combined with the use of nitrous oxide. The free use of narcotics seems to do away with the risk of vomiting during the operation.

#### *The Local Method—Infiltration Anaesthesia*

Next to ether anaesthesia this is undoubtedly the method which is capable of the widest application. It is tedious to induce, and in its larger uses demands wide experience and expert knowledge. It may be regarded

as having two more or less distinct ranges of usefulness (1) in conditions where it is obviously indicated by the anatomical situation and nature of the operation, as in all superficial and definitely limited dissections, in radical cure of hernia, especially inguinal and umbilical, and in excisions of the testicle, (2) as a special procedure where other methods are urgently contraindicated it may be applied by the expert to almost any of the operations of surgery, except where diffuse infective conditions have to be dealt with.

### **The Lævulose Tolerance Test for Hepatic efficiency and its Application in Certain Tropical Diseases.**

By CAPT G COVELL, M.D., F.M.S.,  
*Guy's Hospital Reports, July, 1923*

THIS interesting paper,—a thesis approved for the degree of M.D., London,—is an account of the application of the lævulose tolerance test for hepatic efficiency to certain tropical diseases. The subjects tested were—

(a) Normal controls. Here the results of earlier workers were confirmed, a very slight rise in the blood sugar content occurring an hour after the ingestion of 50 gms of lævulose, and the curve declining to normal an hour later.

(b) General medical cases. Here curves with a very marked steep rise well above normal were obtained in cases of alcoholism with slight hepatic inefficiency and in peripheral neuritis following arsenical poisoning.

(c) Cases with marked hepatic inefficiency, such as hepatic carcinoma and Banti's disease. The curve here rises steeply and falls only very slowly.

(d) Cases of sprue. Contrary to what might have been anticipated there was little indication in the six cases tested of any considerable hepatic inefficiency.

(e) Cases of amœbiasis of the liver. Here the test has proved of great value. The curve rises steeply and falls fairly rapidly. Further, the test is of value in diagnosis of the condition. Thus in one case a lascar complained of pain over the hepatic region and had a temperature of 100° F. The lævulose tolerance test gave normal results however. Three days later benign tertian malarial parasites were found in the blood and the case cleared up on quinine treatment.

In amœbic hepatitis the test is of value, not only from a diagnostic point of view, but also in prognosis and in measuring the degree of improvement of hepatic function after treatment.

### **The Treatment of Dysmenorrhœa.**

THE treatment of dysmenorrhœa is so important and often so difficult a matter that an address on this subject by Mr Leonard Phillips, M.S., M.D., B.Sc., F.R.C.S. (Eng.) before the Royal Society of Medicine, and published in the *Lancet* of the 16th June, 1923, is of considerable interest.

Mr Phillips analysed the results of treatment in 100 cases.

The cases, all of which were treated medically in the first instance, were divided as far as possible into clinical types. An analysis of the case papers brought out the following salient features, almost all the patients pursued a sedentary occupation, all were either single or sterile if married, and the majority had some menstrual irregularity, generally of the nature of excessive loss. Menorrhagia was usually associated with some degree of arrested development of the genital organs. No case had any organic disease. The type and position of the pain were most variable, it might be iliac, or hypogastric, or sacral, it might occur before, during, or after the flow, and sometimes during all three, when it was commonly associated with the passage of clots. Constipation was severe in half the cases. The majority of the patients were poorly developed, with weak abdominal muscles, faulty posture and breathing, and anæmia or visceroptosis, and

many had other complaints such as headache, vomiting, frequency of micturition, and diarrhoea.

*Pelvic examination* was conducted by the rectum in the unmarried, and by the vagina in married women. The arrested development of the pelvic organs which occurred in half of the cases was one of three types: (i) A small acutely anteverted uterus, (ii) a small retroverted uterus, with a short anterior lip to the vaginal cervix, (iii) a small retroverted uterus with a short anterior lip to the cervix. These were associated with poorly developed breasts and a male type of pelvis, and with menorrhagia or fortnightly losses much more frequently than with scanty menstruation.

#### Clinical Types

In treating these cases an attempt was made to interpret all the available information and evolve a plan of treatment based on the recognition of the following clinical types.

In Type 1 dysmenorrhoea was a disease of faulty hygiene, upbringing, and surroundings. This type was thin, anemic, constipated, and poorly developed with visceroptosis and faulty posture and breathing. They followed sedentary lives with little exercise and fresh air. The feeble musculature of the uterus was easily exhausted and gave rise to cramp and pain when called upon to make expulsive efforts in the exhausted state. The treatment was directed to the correction of these faults. The correct mental attitude was cultivated by teaching the patient that menstruation was natural and that she must continue to bathe and take exercise as usual. No constricting clothing should be worn and stays must not be permitted to do the work of the abdominal muscles. Constipation was to be corrected by drinking plenty of water and eating fruit combined with abdominal kneading night and morning. Purgatives should only be a temporary expedient. Exercise such as walking or tennis, and special exercises designed to strengthen the abdominal wall formed an important part of the treatment. Finally the importance of faulty upbringing and surroundings as a factor in the production of dysmenorrhoea and the need of improving these was emphasised. It was not so common to find a robust girl suffering from dysmenorrhoea.

In Type 2 the dysmenorrhoea was functional. These women complained not only of menstrual pain, but generally of headache, nausea, constipation as well. They were usually nervous and worried. Ten cases were treated successfully by sedatives: (a) Bromides and salicylates between the periods, (b) luminal gr i gr iss nightly during and just before the period, and (c) general hygienic measures as already outlined, with attention to bowels and eyes.

In Type 3 the symptoms suggested some form of obstruction as the causal factor. The pain resembled ureteral and biliary colic in its intensity and sudden onset, and subsided rapidly when the clot was passed, just as in biliary and ureteral colic the pain ceased when the stone was passed. Gynaecologists still continued to employ cervical splitting operations, such as anterior hysterotomy for the relief of pain. Finally, in three cases of hysterectomy for dysmenorrhoea performed during the period, the uterus was found to contain clots. Whether the intra-uterine clot was normal and was not dissolved because of endometrial defect, or whether clotting in utero was pathological, must be decided before the pain could be treated rationally. It was reasonable to suppose that a uterus with a poorly developed musculature might be unable to expel casts or clots even through a normal os.

Type 4. There was a type of patient in whom there existed "signs of arrested development of the genital organs." They complained of pain in one or other iliac region alone, or before the central pain. Menorrhagia was as common as scanty flow, because an undeveloped endometrium and musculature were linked up with a normal ovarian stimulus. The obvious treatment was to stimulate development of the uterus, and

this was often successful. In addition to the general hygienic treatment organotherapy and electrical treatment were useful.

*Organotherapy*—Ovarian extract, corpus luteum, thyroid, anterior lobe of pituitary, mixed glands (B W and Co), and hormotone (extracts of ovary, thyroid, pituitary, and testes) had been used. Why the latter (hormotone) should have proved the most valuable in this series of cases it is difficult to say. We know that hypo-thyroidism, hypo-pituitarism, and hypo-oophorism may all be associated with pelvic hypoplasia—a condition observed in one-half of the cases in this series. Perhaps the "gutting gun" prescription like hormotone might hit the mark where the others failed. The possible part played by extract of testis was interesting. This extract alone, or combined with extract of prostate was sometimes successful in dysmenorrhoea. In 1871 Bland-Sutton had pointed out a histological resemblance between the lining cells of the uterus and those of the large intestine one of whose functions is chief absorption.

*Treatment*—Fifty cases were treated with extracts of ductless glands, either alone or in combination with antispasmodics. The best results were obtained by the following combination—

- (1) Mist Cascara co daily throughout the month
- (2) Hormotone, 1 tabloid t.d.s. for seven days before and during the period
- (3) If unrelieved the following every three hours till relief was obtained (up to four doses)

Phenazone	5 gr
Ext caulophyllin liq	15 minims
Caffeine	5 gr
℞ chlorof	1 oz

or—

Phenazone	} 4 gr of each Repeated three hourly up to four doses in cases where pain was severe
Aspirin	
Pyramidon	
Caffeine	

Sometimes tinct belladonnae 5 minims was added to the above mixture and sometimes other antispasmodics such as benzyl benzoate were substituted. Sometimes atrop. sulph 1/100 gr as a tabloid was used.

Forty-six of the fifty cases so treated were relieved. In some cases pain was not abolished, but diminished and in all the forty-six cases the patients were enabled to work throughout the period in comparative comfort. Often when the tabloids were omitted the painful periods returned, only to disappear at the next period when the hormotone was re-administered.

*Electricity in Dysmenorrhoea*—A few of the cases in this series were benefited by electrical treatment, but the treatment was personally administered. High-frequency currents heated up the deeply seated organs so that there resulted (1) dilatation of the vessels, (2) relaxation of spasm and inhibition of tone, (3) improvement in blood-supply and consequent improvement in nutrition and growth.

#### Results

In ten cases where medical treatment had failed, two were cured by curettage and one by anterior hysterotomy. Hysterectomy was performed in two cases where the uterus contained clots and showed marked arteriosclerosis, and the remainder (very severe cases) were sterilised by radium. One hundred cases treated surgically were followed up and compared with 100 cases treated medically. It was found that 25 per cent. were cured, 25 per cent. were relieved, and 50 per cent. were unaffected, while the best results were in cases treated by curettage. These results were inferior to those obtained in the series of 100 cases treated medically. The speaker believed that most gynaecologists felt that the surgical treatment of dysmenorrhoea without physical signs was on the whole disappointing.

correctly described by the psalmist as "deceitful above all things and desperately wicked"

It is no longer justifiable to play for safety and take a serious view of every peculiarity in the behaviour of the heart, grave injury is done to the patient by such a course, it is also unjustifiable to plead inability to form a correct opinion about a heart case because one has not a polygraph and an electrocardiograph. A few hours of mental concentration on the pages of this book will enable any medical man of average intelligence to attain to a position to avoid the tragic errors which are so commonly committed in the diagnosis and prognosis of heart conditions. We all know of the wrecked careers which have resulted from erroneous appreciations of murmurs and irregularities in the heart. Not a few cases of suicide have resulted from the doctors' mistakes in this matter. Dr Heatherley has stated from the general practitioner's point of view to his fellow practitioners the explanation of how to avail themselves of the work of Sir James Mackenzie and Sir Thomas Lewis.

Every medical man and every medical student should read and digest the two hundred pages of Dr Heatherley's interesting and fascinating book.

**PULMONARY TUBERCULOSIS: ITS DIAGNOSIS AND TREATMENT. A Handbook for Students and General Practitioners. By John Guy, M.D., D.P.H. (Camb.), F.R.C.P. (Edin.). Edinburgh and London: Oliver and Boyd, 1923. Price, 16/- Pp. 307.**

THIS book written by Dr Guy, the well-known tuberculosis officer for the city of Edinburgh, is a very valuable addition to the literature on this subject. The book contains 27 chapters. Of these the first 6 are taken up with introduction, epidemiology, description of the bacillus, the spread of infection, pathology and predisposition. The next 14 chapters are taken up with diagnosis, and the description of the disease. The 21st chapter is devoted to prognosis, the next 4 chapters to treatment, and the last 2 chapters deal with prophylaxis and tuberculosis in its public health aspect.

Epidemiology is discussed very thoroughly and various housing, factory and public health acts are dealt with in their relationship to the decrease of the disease. "In 1870 the death-rate per 100,000 in Scotland from pulmonary tuberculosis was 280, and in the year 1919 it was 88. This represents an enormous saving in human life. During the year 1919, 4,294 persons died in Scotland of pulmonary tuberculosis, but if the rate which prevailed in 1870 had continued, in 1919 the number would have been approximately 13,661." The main reason given for this diminution is the gradual education of the public in sanitation, and the gradual improvement in the standard of living. It was found invariably that the highest tuberculosis incidence was in one-roomed houses as compared with houses containing 2, 3 or 4 rooms. In describing the tubercle bacillus other acid-fast bacilli are described. The author remarks that "given an acid-fast bacillus in the sputum, it is invariably assumed that the patient is suffering from tuberculosis." This of course would only hold true in a country where leprosy is not endemic.

The author's opinion is that the result of all the recent reliable experiments is to establish more firmly than ever the fact that the respiratory tract is the main portal of infection in lung tuberculosis.

Chapter 6 on predisposition is full of interesting matter. "After measles, especially if tuberculosis ensues, it is uncommon that the disease is of the acute pneumonic type. In measles there is a lowering of the resistance to tuberculosis which can be showed by the absence of the skin reaction to tuberculosis. A child who will ordinarily give the Von Pirquet reaction, thus showing that it has been already infected by the tuberculosis bacillus, will not show it during or for some time after an attack of measles."

Chapters 9 to 12 are devoted to physical examination which is gone into very thoroughly. The author is

opposed to the use of the ophthalmic test as he has seen conjunctival ulceration which requires many weeks to heal result from this test. He puts more value upon Von Pirquet's method, especially when the result is negative.

The subcutaneous test "is not without some risk, if should not be employed in routine fashion. Some patients have been made much worse by this test and their downward progress began from the date on which it was employed." In chapter 14, X-ray examination is gone into thoroughly and well illustrated, but its limitations are pointed out. The author deprecates making definite diagnosis in all early suspicious cases. "Should the patient develop tuberculosis at a later date, great credit can be gained for having made the diagnosis at such an early stage. If the patient makes a good recovery, more credit can be gained by announcing that it was just got in time, and his case swells the numbers of cures which are claimed on behalf of any special line of treatment which was adopted. No cases of tuberculosis are so easily or permanently cured, as those which never existed."

A useful diagnostic sign is given on page 153. "At other times no crepitations can be detected until the patient has been made to cough at the end of expiration, and then there is heard a perfect shower of fine crackles. This occurs not infrequently, so that no chest examination is complete without listening for post-tussive crepitations. It sometimes happens that the only sign which can be detected indicating active apical tuberculosis is pleural friction, so the significance of this will not be lost on the examination."

Chapter 18 deals with classification. The obvious drawback of the Turban-Gerhardt classification which divides the disease only into three stages according to its severity, is that it takes no note of the general systemic disturbance. A better classification is that adopted by the Society of Medical Superintendents of Sanatoria of Great Britain, dividing the disease according to its anatomical extent and the severity of the lesions and also with regard to the degree of systemic effect.

In chapter 27 the Edinburgh scheme of dealing with tuberculosis by means of central dispensaries is gone into and the work of the founder of the scheme, Sir Robert Philip, is duly appreciated. Philip's system has now been widely adopted in other cities as the most effective way of dealing with the disease from the public health point of view.

The book ends in a hopeful strain. "That tuberculosis will ultimately disappear from our midst the writer has little doubt, and, if the fall in the death-rate continues as it has done, in another 30 years the part contributed by tuberculosis to the general death-rate will be comparatively insignificant."

**A SYNOPSIS CHART OF SKIN DISEASES. By B. Burnett Ham, M.D., D.P.H. With two Coloured Plates. Published by H. K. Lewis & Co., London, 1923. Price, 12s. 6d. net.**

THE author has had the ingenious idea of including in two large coloured plates illustrations of all the commoner forms of skin lesion. Besides the plates there are tables which give the outstanding features of diagnosis, treatment, etc. of these diseases as well as of others which are not illustrated.

The charts are well worth framing and placing in the library of the general practitioner who will find them of great value when he is called on to give an opinion of any cases with which he does not happen to be familiar.

The plates are well executed, and though they cannot be expected to show all the features of every kind of skin disease, they are eminently suitable as aids in making a preliminary diagnosis such as the general practitioner is expected to give to his patients.

It is likely that the book will command a large sale as it supplies a real want to the average medical man.

**LIPPINCOTT'S QUICK REFERENCE BOOK FOR MEDICINE AND SURGERY.** By George E Rehberger, A B, M D, 3rd edition, revised Philadelphia and London: J B Lippincott Co Pp 1009. Price, 63s or Rs 47-4 net Available from Messrs Butterworth & Co. (India), Ltd

THIS is a wonderful book. It is frankly a compilation and it is likely that the expert in each of the many subjects dealt with would find something to criticise in the paragraphs which deal with his subject or speciality, but this is a fault which is common to all books of the kind.

Considering that the whole range of treatment of all the branches of medicine is covered by the book, the information contained is remarkably accurate and up-to-date. The thousand odd closely printed pages constitute a combined medical dictionary and atlas, and it would be hard to discover any point of importance regarding which reference would be made in vain to the volume.

The illustrations are very attractive, especially the 33 coloured plates most of which are derived from the Larousse Medical. In the case of some of the illustrations it is hard to see why they are included, but all of them are fascinating, and one is tempted to turn over the pages of the book again and again merely to look at the pictures. The labour that must have been involved in preparing the book is herculean, but each subject is treated in a fresh and interesting manner, and any medical man who can afford the price of the book will not regret the purchase. For the medical man who cannot find the time or money to buy one of the large encyclopaedias of therapeutics this volume will constitute an excellent substitute. An excellent feature of the book is that the authorities for most of the statements and methods of treatment are quoted in the original words of the authors, so that the reader need have no reason to suspect that the information is of the type that is handed down from one medical book to another. The price at first sight appears to be high, but when the amount of valuable material contained in the volume is considered there can be no complaint in the matter of value.

We can warmly recommend this book to all general practitioners as an attractive and thoroughly useful publication.

It can be obtained from Messrs Butterworth & Co (India), Ltd, and doubtless also from other medical booksellers in India.

**TWO LECTURES ON GASTRIC AND DUODENAL ULCER.** By Sir Berkeley Moynihan. Published by John Wright & Sons Ltd, Bristol, 1923. Price, 2s. 6d. net. Pp. 48

THIS little book is a precious gift to the medical profession, it shows how ignorant the profession is with regard to gastric and duodenal ulcers, and how to dispel the ignorance.

A personal experience of 718 proved cases of chronic gastric and duodenal ulcer justifies some degree of dogmatism on the part of the author. Dogmatism is what we seek for provided it is based on knowledge too much of our medical dogmatism is based on speculation and preconceived notions.

Of the 718 cases, 531 were of duodenal ulcer, (433 in men and 98 in women), 164 were of gastric ulcer (83 in men and 81 in women), 23 were of gastric and duodenal ulcer together.

The author has had 500 consecutive cases of operation on duodenal ulcer without a death.

The important symptom of gastric ulcer is pain, coming punctually at a fixed hour after food, the rhythm being food comfort, pain comfort, food comfort-pain comfort, while the rhythm of duodenal ulcer is food-comfort-pain food-comfort-pain, the pain persisting till the next meal. The diagnosis of duodenal ulcer should be accurate in most cases, that of gastric ulcer is very often wrong even with the greatest experience, and the greatest help

comes from radiology. The test meal seldom gives much help, low acidity is actually as common in gastric ulcer as is high acidity, but in duodenal ulcer high acidity occurs in 2/3ths of the cases. The average duration of the cases which were operated on was about 8 years, most of the cases having been "cured" on several occasions.

Most of the popular medical treatments of gastric ulcer owe their popularity to mistaken diagnosis. The Sippy treatment is rational for duodenal ulcer but not for gastric in which low acidity is the rule. Appendicitis so often antedates gastric or duodenal ulcer that the association may be one of cause and effect. Medical treatment of ulcers must be regarded as greatly inferior to skilled surgical treatment, if it is to be successful it must be very prolonged, even then recurrence is likely.

The mortality from medical treatment is high, that from surgical treatment in skilled hands almost negligible. For gastric ulcer Moynihan prefers partial gastrectomy with anastomosis of the jejunum with the cut end of the stomach. For duodenal ulcer he usually does gastro-jejunostomy or in suitable cases gastro-duodenostomy with excision or cauterization of the ulcer. The end results are 90 per cent of successes, the remaining 10 per cent being as a rule much relieved. In Moynihan's hands the risk of death is about 2 per cent, chiefly from jejunal ulcers and hemorrhage occurring after the operation.

An interesting point is the great increase in free acid which results from smoking.

The book is quite as valuable to the physician as the surgeon, but it must be remembered that the surgeons in India cannot be Moynihans, if they were it would be criminal for physicians to treat gastric or duodenal ulcers. As things are it is not possible to lay down dogmatic rules for the management of the cases, there are no less than three variable factors—the physician, the surgeon and the patient.

**EMERGENCY OPERATIONS FOR GENERAL PRACTITIONERS.** By H C Orrin, O B F, F R C S (Edin), Surgeon, Ministry of Pensions, Orthopaedic Hospital. Published by Bailliere, Tindall & Cox, London. Price, 7s 6d net. Pp XII+135, 1923

THIS little book is meant essentially for the general practitioner who may be called on at any time to perform emergent operations. It is not an advanced treatise like Lejars "Urgent Surgery," but on the other hand it is handy and cheap and it is just what is needed to help the medical man in those times of stress which come to him when he is least prepared for them. It is so handy and cheap as to be available to all and at all times. The methods described are thoroughly up-to-date, the descriptions are clear and so are the illustrations.

A list of the instruments which are needed for the performance of the urgent operations which are described would be a valuable addition to the book and we hope that the author will see his way to include this in the next edition, which will probably be called for at an early date.

**RUBBER AND GUTTA-PERCHA INJECTIONS.** By C C Miller, M D Chicago. Oak Printing and Publishing Co, 1923 pp 99; 10 illustrations. Price, \$1 75.

It is a little difficult to know where to place this little, but interesting, brochure. The author himself notes that "patients should be told that these methods are not as yet recognised as established surgical procedures."

He first reviews the admitted disadvantages of attempts to correct defects and fill up hollows by injections of paraffin, chief among which is a superficial chronic congestion of the overlying skin "BIPP"—valuable though the preparation is—has certain disadvantages, even in bone work. Fat transplants are uncertain, and here he describes a method which he has used of injecting



the patient's own fat hypodermically into the hollows with a special type of syringe

Finally, however, he was led to the use of rubber,—regarding the composition and preparation of different grades of which the book gives a full account. What he advocates for the treatment of hollows, depressed nasal bridge, etc., is the forcible injection either of rubber in a molten state, or in solution in a solvent, preferably ether. Admittedly the work recorded is of a preliminary character only, whilst the author insists that each brand of rubber used shall be first tested in guinea-pigs to ensure that it does not contain toxic compounds. The syringe used is a strong brass one, with a screw piston which exerts considerable pressure, and a screwed-on needle of No 17 or 18 bore. Even so homely an article as the domestic rubber sponge may be ground up in a mill, admixed with glycerine, and injected under full aseptic precautions.

No case records are given, and it appears doubtful whether this little brochure is written chiefly from the surgical or from the rubber point of view! Yet the idea suggested is very intriguing. Surgeons in India are very frequently called upon to remedy nasal and facial defects, and in this little volume they may find several quite ingenious and useful suggestions.

**THE HYGIENE OF MARRIAGE.** By Isabel Hutton, M.D., with a foreword by Professor Louise McIlroy, M.D., D.Sc., O.B.E. London: William Heinemann (Medical Books) Ltd., 1923. Price, 6s. net. Pp. 112.

THIS is one of the best books of this class that we have seen. It is written for the layman by a well known medical woman. The chapters deal with the period before marriage, the consummation of marriage, married life, birth control and the use of contraceptives. The writing is sane throughout, well balanced and the woman's point of view is specially considered. Unhappy marriage rests so often upon ignorance of sexual facts that some such book is almost essential for the guidance of the growing adolescent and the young man or woman, who is about to enter on married life. The subject is, or used to be, ignored in medical schools and the medical practitioner not infrequently has to confess his ignorance with regard to it.

On the subject of birth control the author takes a reasonable view, she admits its necessity in some cases, its selfishness in others. The book is one which is exactly of the right type for medical practitioners to recommend to enquirers.

**PRACTICAL INFANT FEEDING.** By L. W. Hill, M.D. Published by W. B. Saunders Company, 1922, Philadelphia and London. Price 24/- net, Pp. 483.

IN his "Practical Infant Feeding" Dr L. W. Hill of Boston, has demonstrated his ability to take a wide view of a wide subject. Like all good paediatrists he never fails to emphasise that breast feeding is preferable to every combination of German chemistry and American milk modifications. He has realised that too many practitioners feed blindly and that the fundamentals of the science of nutrition must first be understood, so he begins with the baby's normal and pathological chemistry of digestion, makes clear the two opposing processes—fermentation of carbohydrate and putrefaction of proteins, and emphasises the value of macroscopic examination of the stools and of weekly weighing. He rightly maintains that absolute regularity in nursing hours is more important than whether a three or four hours' interval is observed. He follows no particular school, but tries to cull the truth from all, and this open attitude of mind is not a fault, but the only justifiable stand-point with a subject still in an early developmental stage.

He pays tribute to all the pioneers of modern artificial feeding, to those who studied the food rather than the baby, and to those who studied the baby primarily and his food secondarily, to Escherich who first investigated the normal intestinal flora, to Czerny and Keller who considered fat the worst offender in causing nutritional disturbance and last but not least to Finkelstein who studied sugar fermentation and the whey salts and then evolved his protein-milk treatment.

He differs, however, from the German school in recognising protein indigestion, and in his own practice uses gravity cream and skimmed milk formulas. These are sound, but until we get a more regular milk distribution will be difficult to apply in India. He postpones to an unreasonably late date, the eleventh or twelfth month, the giving of whole milk, undiluted, in the artificial feeding of the normal infant. He has not time for theoretic caloric requirements, and says "Feed the baby all he will stand irrespective of calories." Marasmus he truly and graphically describes as "the end result of prolonged digestive insult." Chapter XII which deals with "The Diarrhoeal Diseases" is written in a more dogmatic manner than the rest of the book and here he indicates the medicinal and other treatment as well as the diet. The "Care and Feeding of Premature Infants" is contributed by Dr W. W. Howell and is more American in its style than any other chapter. He says the "cubical contents of the baby" are synonymous with "heating plant" and he only mentions incubators to condemn them. The concluding section is occupied with the dietetic deficiency diseases, rickets, spasmophilia and scurvy, and is thoroughly up-to-date in its review of recent experimental work.

The chief defect of the book is that it does not make clear the relationship of chemical processes, pathological findings, and clinical features. This is admittedly difficult, but the author might have crystallised for the reader clinical entities by detailing more of his own clinical cases, illustrating the theory and proving the value of the treatment advised.

The author, however, is to be congratulated on his success in the difficult task of reviewing with commendable fairness a very controversial subject, sifting the grain from the chaff and giving to the harassed practitioner a trustworthy guide.

**WOMEN'S LABOUR IN BENGAL INDUSTRIES.** By Miss Dagmar Curjel, M.D., D.P.H. *Bulletins of Indian Industries and Labour*, No 31. Superintendent, Government Printing, Calcutta. Price, 8 annas. Pp. 40.

IN this interesting brochure of 40 pages Dr Curjel records the results of an enquiry held between November 1921 and October 1922 into the conditions of female labour in the jute and cotton mills around Calcutta, the tea districts in the Dooars, Terai and Darjeeling Hills, and in the Bengal coalfields. Observations shewed that the strain of industrial life is chiefly felt by women workers during the child-bearing ages. It would be better for the welfare of both mother and child if women workers were compelled not to undertake industrial work for six weeks before and after confinement, but this would be impracticable unless adequate maternity benefit was given, conditional on such cessation from work. There is a special need for the appointment of women factory inspectors,—a measure which has led to great amelioration of conditions in other countries. At present, however, social workers in Bengal have not yet taken up the question, whilst District and Municipal Boards do not concern themselves with it at all.

Women form about one-quarter of the labour in the jute mills and one-fifth of that in the cotton mills. As it is not possible for a woman to live for any length of time alone in a mill compound, the woman worker usually seeks the protection of some male worker, whether a husband or not, to whom she hands over her wages. The weekly wage for a woman amounts to about Rs 2-8-0.

and she cannot afford to cease work for many days after childbirth. The Factories Act amendment of 1922 has raised the minimum age at which children can be employed in mill work from 9 to 12 years, but does not apply to children enlisted before that date, who have heavy loads to carry, and many of whom shew evidences of malnutrition and of physical strain. Mothers also bring their infants and young children into the factories with them to feed them, and both mother and children suffer in health in consequence. The establishment of creches is advocated.

Dr Curjel advocates that a portion of the considerable sums spent by managements on sanitation and health might well be set aside for women health visitors and nurses. Over-crowding is very prevalent in the mill lines, the average number of adults per room being about four, but not infrequently from 11 to 16 persons were found to be occupying one room. A most interesting condition discovered was yute dermatitis, the pathology of which was worked out in conjunction with Major H. W. Acton, M.S., at the Calcutta School of Tropical Medicine. The oil used in jute manufacture tends to block the mouths of the glands in the skin, dirt gets ingrained into the skin and a local dermatitis results. Many mills provide dispensaries, but women only attend these dispensaries for general illnesses and accidents, and all maternity work is left to untrained *dais*. As there is only one doctor to some 4,000 to 6,000 workers, house visitation is almost impossible. Venereal diseases constitute a most important but hitherto completely neglected problem. Mill owners in Bombay have found that it pays to establish a scheme for a trained nurse or health visitor with resident trained midwives, and the details of such a scheme costing in all Rs 10,820 for a group of mills are given. The health of the women workers is materially improved and the labour force becomes much more contented. At present a woman is usually absent from work on account of childbirth for only two to four days. If maternity benefit is given, it should be given in kind and not in cash, since a cash benefit would only be handed over to the male worker with whom the woman is working.

In the tea industry conditions generally are much better. The coolies tend to settle down on the estates with their families and many of them save money and buy land. Women are mainly employed in plucking and a skilled plucker can easily earn Rs 4 to Rs 9 or even considerably more without strain. The children's schools are practically a dead letter since the children are also generally employed on light duties in the gardens. Housing conditions are on the whole not bad. In general both women and children looked healthy and well cared for. Many gardens give a maternity benefit and the value of female labour on the gardens is shewn by the fact that the maternity benefit is often the same for either a boy or a girl. On such gardens it was found that the birth rate was high, being from 70 to 90 per mille women present on the gardens. Even on the tea estates, however, the introduction of a system of female health visitors and trained nurses for maternity work would materially benefit the labour force concerned.

Labour on the Bengal coalfields is casual and not to any great extent settled. The quarters provided are on the whole good, and the Asansol Mines Board of Health has taken considerable trouble over the question of workers' dwellings. The women work underground in shifts of from 5 to 8 hours, and they are employed chiefly on carrying the cut coal to tubs. An average day's earnings for a woman are from 8 to 12 annas. The atmosphere in many of the mines is bad, and nursing mothers bring their infants into what must be condemned as a totally unsuitable atmosphere. In the smaller collieries women often have to carry a load of 60 to 80 lbs for distances up to 200 yards. There is no organised sickness benefit but it is customary to pay a small sum of about 3 or 4 annas weekly to workers who are ill in their *busties*. The birth rate it is impossible to assess

correctly, as so much of the labour is casual. The Chief Sanitary Officer to the Asansol Mines Board of Health employs two trained midwives and the cases attended by them do very well.

In general Dr Curjel advocates a policy of the introduction of women health visitors, resident nurses and midwives with *dais* under them for training, the provision of creches, and the giving of maternity benefit, the full details for such a scheme being given on page 39 of the pamphlet. Most managing agents are only too anxious to improve the conditions under which their labour forces live in order to attract a good class of labour, and we trust that they will study Dr Curjel's report and act upon it.

**THE EXPECTANT MOTHER AND BABY'S FIRST MONTH** By F. Truby King, C.M.G., M.B., B.Sc. (Edin.) Angus and Robertson, Ltd., Sydney. 123 pp., 1923. Price, 2s. 6d.

THIS little book will be found most useful by medical men, health workers and child welfare workers to recommend to their patients. It is by the Director of Child Welfare for New Zealand, is well illustrated, and well printed.

**THE PROGRESS BOOK** By J. J. Pilley, Ph.D. Revised and enlarged edition. London: Leadenhall Press, Ltd., 1923. Pp. 144. Price, 2s.

THE Progress Book is specially prepared to facilitate the keeping of complete records of the progress of the child from birth. It can be had from Mellin's Food Ltd., London, S.E. 15. The price of the book is from 2/- to 4/6 according to the style of binding.

**PAPERS ON PSYCHO-ANALYSIS** By E. Jones, M.D., M.R.C.P. (Lond.), 1923. 3rd edition. pp. 731+X. Messrs Baillière, Tindall & Cox, London. Price, 25/- net.

"It is impossible to tell the truth so that it should be understood and not be believed" quotes Dr Jones, from Blake, on his title page, and certainly this wonderfully interesting book goes far to verify the dictum. Brushing aside the anatomical and physiological aspects of mental processes,—which have not yet penetrated into the true secrets of thought-formation,—the author sets out in a remarkable series of papers the complete Freudian theories on the subject. And the book is arresting in its admirably written and clear style, the interest and importance of the subject-matter dealt with, and the numerous illustrative cases quoted. Finally, one may add, the book is very much up-to-date and this edition incorporates five new chapters, whilst five others have been re-written.

Freud's basal theorem is his division of thought-processes into the conscious, the pre-conscious, which lies just below the threshold of consciousness and which can easily be recalled into consciousness, and the unconscious. Deep seated in all mental processes and quite unrecognised by the individual the activities of the unconscious go on throughout his waking and sleeping life. Further the unconscious, being the most primitive, is entirely non-moral and entirely self-centred. For it the ego is all, the gratification of its impulses and desires and wants the sole end and aim of existence, it is completely out of touch with reality, with the superimposed ideals and repressions of civilisation and education. Its dream fancies are to it more real than are his conscious thoughts to the waking individual. It is prepared in thought and literally, to "wade through slaughter to a throne," to tread under foot every element of opposition, to imagine itself the lord of creation.

When overlying and repressing this egoistic and unconscious self, we have the super-dominant mechanism



Anti-malarial operations at Banbassa were directed chiefly towards the destruction of mosquito larvæ and the elimination of their breeding grounds by applying both well recognized and special methods in each case, as the result of investigations and experiment.

In addition to the destruction of mosquito larvæ, the labourers employed on the canal were given quinine as a prophylactic measure during the periods of the working season when it is found by dissection that the adult anopheline mosquitoes were infected with the parasites of malaria.

The effects of all these measures are best judged by results. Work on the Canal at Banbassa was continued until the end of June whereas in 1921 it ceased in May and in 1920 had to be stopped in April.

The Assistant Director of Public Health (Malariology), is satisfied that it will be possible to carry on work in the future until the end of July or even later if suitable accommodation is provided for the labourers and the rains do not interfere with the work. In addition to the work at Banbassa the undermentioned towns were surveyed and reports and recommendations submitted to the authorities concerned—

Lhaksar and Moghal Sarai (at the request of the Oudh and Rohilkhand Railway)

Kathgodam (at the request of the Naini Tal Motor Transport Company)

Tanakpur Kichcha and Haldwani (at the request of the Superintendent Tanai and Bhābar Estates)

These reports included the results of investigations into the prevalence and sources of malaria at each of these places all of which are highly malarious.

Splenic indexes among children were worked out and the breeding grounds of carrier mosquitoes were noted in maps prepared of the various places.

The relative importance of these breeding grounds were established, firstly, from the type of anopheline mosquito breeding in them and secondly from their proximity to the inhabited parts of the town.

The identification and classification of adult mosquitoes caught and those bred out in the laboratory from larvæ collected from the various breeding grounds were carried out.

Nagina was visited with a view to indicating to the local authorities the exact location and the measures required to deal with some breeding grounds mentioned in reports made on the town in 1921.

Moradabad—Magic lantern demonstrations and popular lectures on malaria were given here during the exhibition held in February. These lectures were well attended and it is hoped that some good was achieved.

The town was visited again in November with the object of investigating the probable effect on malaria of the altered course of the main stream of the Ram Ganga river. A supplementary report on this was submitted, which to a great extent altered the recommendations made in the original report.

Gajrou'a Kadir Camp—Anti-malarial measures were undertaken here in March on account of the visit of His Royal Highness the Prince of Wales.

Bareilly—The department concentrated here from August to October and a survey of the town was undertaken. It is gratifying to be able to state that Bareilly is found to be remarkably free from malaria. The breeding grounds are few and the splenic index taken among the children was very low, being only 3 per cent of those examined. A full report is being prepared.

Pilibhit—A preliminary survey of this town was made in December and a full report of it is under preparation. Here the spleen index was only 7 per cent, showing a low incidence of malaria.

From the point of view of results, the work of the department at Banbassa is unquestionably the most important and it is gratifying to note that the fruits of our labours here have been beneficial to the health of the large labour community employed and will greatly accelerate the construction of what is going to

be one of the most productive works ever undertaken in the Province.

No progress was made with the Saharanpur, Nagina and Kosi anti-malarial schemes during the year owing to lack of funds. At Meerut the cutting of the Abu nala and the improvement of the Victoria Park tank, towards which the Board of Public Health gave grants of Rs 32,000 and Rs 5,544, respectively, has been taken in hand. The filling in of the depressions in the neighbourhood of the Sooraj Kund tank is also being carried on.

Special attention must be called to the District Health Scheme which constitutes one of the possible methods of controlling epidemic diseases and of promoting public health.

*District Health Scheme*—The District Health Scheme which consists in the staffing of districts with District Medical Officers of Health (Indian D P H's), Assistant District Medical Officers of Health (L P H's) and Sanitary Inspectors, was introduced experimentally in the districts of Basti and Gorakhpur from June 1922. Gorakhpur being a large district was divided into two halves, each being treated as a separate district for this purpose. In the first instance half the cost of the superior staff was met by Government, and the other half together with the cost of the subordinate staff and contingencies by the District Boards concerned. A detailed report on the working of the scheme has been submitted to Government. Col Dunn's view of the value of the scheme is stated in his own words as follows: "As a result of my personal inspection there is no doubt that it is a success. The local authorities concerned are very favourably impressed with the results obtained in the short period of the experiment and highly appreciate the work of the staff."

"The staff have made themselves popular, especially in the villages, and their services are in great demand all over the districts. They have increased the efficiency of vaccination in all the three districts. They have stamped out most effectively outbreaks of epidemic disease and have done splendid work in dealing with the present plague epidemic. Owing to their close supervision the travelling dispensaries in these districts have done good work, and are much more efficient than those in other districts, which are only inspected at long intervals. The work of these district officers, in whose interest it is to popularise themselves with all classes of the community, is in striking contrast to the work of peripatetic and constantly changing special Health Officers and sub-assistant surgeons in charge of largely unsupervised travelling dispensaries. It is certain that the District Health Scheme on the present lines will produce far more effective results than any other feasible agency in improving the general public health of the population they have to deal with."

#### *Instruction in Hygiene*

*Provincial Hygiene Institute Buildings*—During 1922, the D P H the L P H and Sanitary Inspectors' classes were conducted as in the previous year, in the Pathological building in the King George's Medical College, by Rai Bahadur Dr D D Pandya, Assistant Director of Public Health and Dr Cornelius. The work was carried out under difficult circumstances owing to insufficient accommodation.

The standard of the tuition given in these classes would be considerably improved with the present staff if a properly equipped institute were available, and it is hoped that funds will soon be found for this purpose.

*D P H class*—The D P H was taken over by the Lucknow University during the year and the ten students who took the course of the United Provinces State Board of Medical Examinations in 1921 were admitted to the examinations of the Lucknow University held in April 1922. Seven candidates out of the ten were successful in the examination for Parts I and II.

The supplementary examinations for the three unsuccessful candidates were held in October. Two of them passed and one failed to satisfy the examiners in Part II.

The D P H classes were started under the revised rules of the Lucknow University in November. These rules comply with the recent requirements of the General Medical Council thus making this Diploma the only one in India of the recognised standard in England.

One student was admitted to the class who is at present undergoing the course in Part I. As the prospects of Public Health appointments in the United Provinces and in India in general become better, it is hoped that there will be many candidates for this first class diploma.

**L P H class**—Out of seven students admitted to this class in July 1921 one dropped out in the early part of the course and six appeared at the L P H examination held in April 1922. All the candidates were successful.

The present L P H class started in July, 1922. Seven students were admitted of which one left in September 1922 and reverted to his post in the medical department. The remaining six students are still undergoing the course.

**Sanitary Inspectors classes**—These classes commenced in October 1921 and the course was finished about the middle of February 1922. Out of the twenty-three candidates who appeared at the examination for Sanitary Inspectors held in February 1922, 18 passed.

Of the 33 students who were admitted to the apprentice Sanitary Inspectors examination in February 1922 22 were successful.

Both the present Sanitary Inspectors' and Apprentice Sanitary Inspectors classes were started as usual in October 1922 with 16 and 21 students respectively.

**Chief Sanitary Inspectors**—Five candidates were examined in March 1922 of which two were successful.

#### *Hygiene Publicity Propaganda*

The post of the Director of Epidemiology having been abolished from 1st August 1922 the Director of Public Health is now in personal charge of the Provincial Hygiene Publicity Bureau. The activities of the Hygiene Publicity Campaign the object of which is to promote the spread of knowledge, chiefly among the illiterate in the fundamental laws of health and to give some idea of the commoner infectious diseases by means of illustrated lectures, stories, charts, posters, models, magic lantern demonstrations, exhibitions of cinematographic films, etc., were expanded during the year, new districts and towns having been taken up for demonstration purposes. The Assistant Hygiene Publicity Officer is in immediate sub-charge of this branch and he organises popular lectures and magic lantern demonstrations. These demonstrations have been much appreciated and have attracted large crowds.

The grant sanctioned by Government during 1922-23 supplemented by contributions from different Municipal and District Boards was Rs 34,800 of which Rs 34,700 were expended during the year. Owing to financial stringency it has not been possible for Government to allot the non-recurring amount of Rs 47,000 which was originally proposed to be expended during another three years so that the Bureau is still working with one quarter of the material originally proposed, and has only been able to deal with the seven subjects—Cholera, Plague, Malaria, Tuberculosis, Small-pox, Child-welfare and Flies.

Booklets and posters prepared on the above seven subjects were distributed to the Publicity Commissioner, the District Magistrates, the Directors of Public Health of other provinces and to various other important bodies. These have been well received both by the press and the public. The Director of Information, Royal College of Science, Bombay wishes to reproduce these booklets with a few alterations to suit Bombay

conditions and has been given the loan of our drawings. The Secretary North India Tract Society, Allahabad has taken samples of booklets in Urdu and Hindi for distribution. The Oudh and Rohilkhand, the East Indian, the Great Indian Peninsula, the Rohilkhand and Kumaun and the Bengal and North-Western Railways have also taken the booklets for distribution in their schools in the United Provinces.

The provincial travelling dispensaries which will in future be in charge of Medical Officers with a License in Public Health will be chiefly used for propaganda work and the prevention of endemic and epidemic diseases. Seven more magic lanterns have been purchased this year and we now have 32 in all. This will enable us to supply one lantern to each of the travelling dispensaries. This will prove a great advance in their utility.

#### THE COUNTESS OF DUFFERIN'S FUND ANNUAL REPORT FOR 1922 CALCUTTA SUPD'T GOVT PRINTING, INDIA PRICE Re 1-8-0

This report is extremely interesting and very well put together. It shews at a glance the whole field of work by medical women in India and how immensely such beneficent activities have expanded since the first inception of the Fund in 1885.

The annual report of the Council is by Lt-Col T J Carey Evans, M.S. and Dr M I Balfour, C.M.O., M.S. The subsidy from the Government of India was increased during the year to Rs 3,70,000 and the present list shews 37 officers on the permanent cadre of the Women's Medical Service for India. The Council decided to give one or more scholarships of the value of £200 a year for Indian women graduates for study in the United Kingdom. In addition there are 15 scholarships at the Lady Hardinge College Delhi, 2 at the Campbell Medical College Calcutta, 3 at the Grant Medical College Bombay and one each at the Medical Colleges, Calcutta and Madras.

The conditions of service of the junior branch of the Women's Medical Service were carefully considered during the year and personal allowances have been granted to the assistant surgeons in the junior service. It is hoped that the Provincial Governments will see their way to admitting women assistant surgeons on the same pay scale as men. The Lady Reading Women of India Fund developed further during the year and subscriptions have now reached a total of Rs 1,07,561 of which sum Rs 2,88,000 has been earmarked for the Lady Reading Hostel for nurses at the Lady Hardinge Medical College Delhi and 5½ lakhs for a suitable women's hospital at Simla. The remainder forms the Lady Reading Indian Nurses Fund.

There are now 436 women medical students under instruction in different medical schools and colleges in India, and no less than 145 hospitals staffed by women only. Yet such provision merely touches the fringe of the problem. The writers regard the needs of the country as regards medical aid by women as being (a) a far greater number of hospitals staffed by women, (b) a far larger supply of Indian women doctors both for hospital and private work, (c) more opportunities for post-graduate training, (d) more training schools for nurses and midwives in connection with women's hospitals, and (e) a constant supply of lady doctors, nurses and midwives to take up preventive work in connection with maternity and child welfare in all parts of the country.

Turning to the sectional reports included in the main report, there were 94 students in residence at the beginning of the year at the Lady Hardinge Medical College, Delhi. Despite previous government grants, the finances of this institution are still faced with the all-prevalent stringency. Both the library and equipment stand urgently in need of further funds whilst

an annual deficit of Rs 97,000 is recorded. The college and hospital were built and equipped by public subscription, and it was expected that the Government of India would thereafter take over the responsibility for running both. As medicine is a transferred subject, however, this has not been done. Appeals to the Provinces and for private donations have brought in some Rs 28,000 recurring, but the whole position is one of acute stringency. The Lady Reading Hostel for nurses was ready for opening, and will accommodate 67 nurses. At present the hospital accommodates 120 patients, but future provision for 200 has been provided, when the nursing staff will be increased from 40 to its full complement of 67,—(a very liberal figure when compared with hospitals staffed with male doctors in India, we may observe). Twenty-three lady students were preparing for the final M.B., B.S., Punjab University, whilst out-patients numbered 26,025 attendances and in-patients 1,891 during the year,—showing the wealth of clinical material available for teaching and observation.

Reports from the Women's Medical School at Agra and the Training School at the Cama and Allibless Hospitals Bombay, follow. At the Lady Dufferin Victoria Hospital, Calcutta, 11 European nurses passed their first midwifery examination, and 3 Indian nurses and 2 compounders completed their training. At the Government Victoria Hospital, Madras, the number of obstetric cases,—1,065 up to November 30th,—was very greatly in excess of those for any previous entire year, and much interesting abdominal surgical work is recorded. At Karachi out-patients numbered 9,308 and in-patients 1,589. In the Punjab the number of registered midwifery certificate holders has increased from 243 in 1921 to 371 in 1922,—a sufficient indication of the activities of the Fund. At the Dufferin Hospital, Nagpur, the experiment of leaving fees from patients was introduced in place of driving patients away as was feared, experience has shown that well-to-do patients pay willingly. The additional income together with the most stringent economy, has just enabled the hospital to carry through the year.

Two courses for post-graduate instruction in venereal diseases were held in the Central Dermatological Laboratories, Poona, during the year, and were attended in all by 16 students.

The report includes much miscellaneous information of value. The rules and regulations for the Women's Medical Service for India shew a praiseworthy imitation of the Civil Service Regulations, but fortunately appear to be much less complicated than is the latter compilation. The statement of assets and liabilities shews that the Fund closed the year with Rs 5,18,551 worth of assets in excess of liabilities. The reports from branches and from Indian States shew that everywhere a vigorous policy is being carried out, in Assam the pay of lady doctors was improved, and the government grant raised from Rs 5,240 per annum to Rs 9,090. Lists of the women's hospitals in India staffed entirely by women and of the qualified medical women in India, Burma and Ceylon complete the volume.

What womanhood in India needs unquestionably is attendance by skilled medical women, both European and Indian,—as the many zenana mission hospitals in India have discovered long ago. In the Women's Medical Service for India we have the first beginnings of such an organisation, built up with its superior and junior branches and its assistant surgeons, midwives, health visitors and the like. From such a central nucleus,—as the current report shews,—an extension is certain to arise, until the entire country is covered with a network of such beneficial activities. Careful observers of matters Indian have often claimed that what is at the root of most of the evils in this country is the ingrained conservatism or prejudices of Indian womanhood, prejudices which often influence the actions of male members of the household to an entirely unsuspected extent. In such a service of

skilled women medical officers for attendance upon the womanhood of India exists at least the nucleus for educational and public health advances of no mean order.

#### ANNUAL REPORT OF THE VICTORIA MEMORIAL SCHOLARSHIPS' FUND FOR THE YEAR 1922 BY DR M I BALFOUR, CMO, WMS CALCUTTA SUPDT, GOVT PRINTING, INDIA PRICE 8 ANNAS

THE Victoria Memorial Scholarships' Fund was instituted in 1904 for the purposes of training midwives and indigenous *dais* in modern methods, providing teachers for such classes, and in general attempting to improve the conditions of childbirth in India. The accounts for the calendar year 1922 shew an opening balance of Rs 77,646, receipts totalling Rs 40,004—mostly from interests on investments, an expenditure of Rs 47,025, and a closing balance of Rs 70,025.

That this valuable fund is accomplishing its objects, there can be no doubt. From such different provincial centres as Hyderabad, Smd, Lahore, Dacca, Asrapur come reports which speak of improvement. Thus in Dacca 19 out of the 46 indigenous *dais* on the municipal register are undergoing treatment at the centre, and nearly 95% of the staff cases were taken up at the instance of the *dais*. In Simla it is exceedingly difficult to cope with the demand for *dais* trained at the centre, whilst at Lahore municipal centre the number under training has doubled within the year. Thus the Indian is gradually beginning to learn that clean midwifery is a boon and that dirty midwifery spells disaster.

Miss Balfour writes of two immediate tasks which should be undertaken and pressed forward with vigour, (a) the training of Indian women as health visitors and maternity supervisors, and (b) the obtaining for local bodies of the power to introduce rules for the proper conduct of labour cases in their areas. With regard to the first, training schools have now been established at Delhi, Lahore and Madras, and it is hoped to open up others soon. With regard to the second, Burma has taken a step forward in commencing a voluntary register for trained midwives.

In addition to such training classes the Fund also issues publications in both English and in vernacular, and models for classes. In general the actual line of work in towns is through the medium of midwife supervisors, who visit houses where children have recently been born, see the work of the trained *dais*, weed out the good from the bad, and advise on infant welfare and household hygiene.

The Fund appears to be in a flourishing position, and to be tackling at least the fringe of what may be described as India's greatest problem.

#### COLONY OF MAURITIUS ANNUAL REPORT OF THE MEDICAL AND HEALTH DEPARTMENT FOR 1922 BY DR T B GILCHRIST, M.D., C.M., D.P.H., FRF.P.S.

THE island of Mauritius has been visited during the past three years by two distinguished medical visitors, by Dr Andrew Balfour in 1921, and in 1922 by Dr Malcolm McGregor. The result has been to some extent to strengthen the hands of the local medical officials who are up against a most difficult state of affairs.

Dr Gilchrist's report for 1922 shews how Mauritius, which was once a health resort, is now in a condition almost typical of any large Indian town. The estimated population of the colony in 1922 was 377,594, the birth rate for 1922 was 37 per mille as against an average of 36.2 for 1918-1922. The death rate was 34.5 per mille, as against 42 for the preceding five years. Port Louis shewed the highest death rate and malaria, pneumonia, influenza and infantile mortality

were the chief contributory factors. The infantile mortality rate for 1922 was 147.9 per mille as against 179.7 in 1921. A midwifery and child welfare scheme was started under the Director of the Medical and Health Department, but as no funds were available the health visitors were discharged, the number of pupil midwives was cut down to 10 and the scheme has lapsed. The crèches however continued to do good work, that at Port Louis being rendered mosquito-proof during the year and a new one opened under the Immigration Department.

Malaria accounted for 2762 admissions to hospitals with a case mortality of 1.5%, representing 9.1 per mille of the population. A spleen census of the children in the schools gave a spleen index of 15.8% of 14,659 children examined. It will be seen that malaria is a serious problem in Mauritius. Dr Mikolm McGregor visited the island in 1922 in order to work out its malaria problems and found the chief carrier to be *A. costalis*. This was found up to altitudes of 1,200 feet and contrary to what might have been anticipated, hibernation does not appear to occur in the coastal belt. What carries this species over into the next year is that it seeks higher and more sheltered winter refuges until the onset of warmer weather and the beginning of the monsoon season.

Enteric fevers accounted for 224 cases registered and 20 deaths out of 74 cases admitted to hospitals. The water supply of Port Louis which is unfiltered water from the Grand River was apparently largely responsible. Notification being very half-heartedly carried out a meeting of medical men was called together in the hopes of improving matters. Leprosy is not notifiable in the island there were 37 lepers at the St. Lazare asylum and 12 new admissions during the year. Plague showed 98 attacks only as against 375 in 1921 but it still occurs each year. Dr Gilchrist gives as reasons for this the dilapidated character of many of the buildings, general overcrowding of the population, lack of proper facilities for food storage among the poorer classes, lack of any attempt at erecting rat-proof gran godowns, the fact that every Chinaman's house is a grain store, and the general apathy and ignorance. Propaganda work is badly wanted. Venereal diseases are probably very rife in the island, but only those venereal patients who are incapacitated by these diseases come to hospital.

Of other diseases, phthisis accounted for 444 admissions. The tuberculosis dispensary advocated by Dr Balfour was not sanctioned, and the new tuberculosis ward in the Civil Hospital at Port Louis was utilised instead. This however defeats the objectives desired as the climate is not suitable and the segregation but partial. A tuberculosis bureau for notification and diagnosis is much to be desired. Beriberi accounted for only 17 deaths in 1922 as against 71 in 1921.

Dr Hampton representative of the International Health Board, opened an anti-hookworm campaign in May. Owing to lack of facilities the work was largely confined to schools and prisons. Moka district was selected as the best treatment centre, and much propaganda work was initiated.

The mortality amongst women in childbirth is very high, 16.9% per mille of live births, and Dr Gilchrist believes that even this figure is probably an underestimate.

Of general sanitary measures urgently needed in the island Dr Gilchrist advocates a rat-proof housing scheme for working classes, the closing down and demolition of slum property, an adequate and pure water supply for Port Louis, rat-proof granaries, a midwifery and child-welfare scheme, a venereal disease centre, an improved soil sanitation scheme, and better notification of births, deaths and special diseases.

Annexures to the report are first that on the Bacteriological Laboratory by Dr F. J. K. Momphe, where 1,850 specimens were dealt with during the year. Also an abridged report on Port Louis by

Dr J. Balfour Kirk, who dwells upon the upheaval following Dr Andrew Balfour's visit and the special efforts made to clean the town. He records the water supply as the most urgent sanitary reform needed, the housing conditions as acute, and the central market as a disgrace to the town. The meat carts were replaced by a fly proof motor van and trailer during the year. Power to control the quality of food and drugs is practically non-existent, and the milk trade is "in as corrupt a state as it could be." 52% of 276 milk samples analysed were found to be "sophisticated,"—a somewhat euphonious term for a most dangerous condition. 86 prosecutions were successfully entered and fines to the extent of Rs. 4509 inflicted. By degrees, as milk vendors find that it does not pay to sell adulterated milk the condition of affairs may improve. The measures taken against plague and malaria in Port Louis are detailed. Finally Dr F. L. Keisler contributes a note on the results of medical inspection of schools.

It is clear from Dr Gilchrist's interesting report that conditions in Mauritius are "Indian," and this picture of health conditions in an Indian overseas colony is not without interest.

#### REPORT OF THE MEDICAL DEPARTMENT OF HONGKONG FOR 1922 BY DR J. T. C. JOHNSON, CHIEF MEDICAL OFFICER

This report contains many items of interest to medical workers in India since it throws light on many Indian diseases from a different point of view. The total population of the colony is estimated at 666,102, including 15,200 British and foreign civilians. The birth rate among the non-Chinese is 669, and that among the Chinese is estimated at 625, but defective registration in Hongkong renders it impossible to get at the true birth rate among the Chinese. Deaths however are accurately registered and the total number of deaths was 14,569—and the death rates were 25.47 for Chinese and 20.46 per mille for non-Chinese. Infant mortality among infants less than one year old accounted for 51 deaths among non-Chinese and 4,216 among Chinese, but since the birth rate cannot be accurately known it is impossible to calculate the true figure for infant mortality.

Turning to the diseases prevalent, beriberi patients totalled 12% of the cases at the Tung Wah Hospital, 846 cases, and the disease appears to be very definitely on the increase. It is almost exclusively confined to the Chinese, and its frequency is explained by the fact that it is very difficult indeed to buy non-polished rice in the colony. Marmite was tried in treatment at the civil hospital by Dr C. W. McKenny, who reports it to be rapidly effective and useful. Plague was more prevalent in 1922 than in former years,—1,181 cases certified. The three species of rats present in Hongkong are *Rattus norvegicus*, *Rattus rattus* and *Mus musculus*, and the fleas present *Xenopsylla cheopis* and *Ctenocephalis canis* and *felis*. 85 per cent of the rats found to be infected were *Mus decumanus*. The Sanitary Department takes all possible precautionary measures against the disease, but to periodically disinfect all junks and kill their rats and fleas is an impossible proposition with the existing staff and would require a much larger organisation. The law in Hongkong now requires the ground surfaces of all dwellings to be covered with concrete and every drain and opening for ventilation has to be protected by an iron grating. In newly constructed houses hollow walls and ceilings are not allowed. A point of interest in the diagnosis of plague is a note by Dr McKenny on 12 cases which showed a small patch of skin necrosis, usually but not always on the buttocks, and with or without buboes. Material obtained on incision of such areas showed *B. pestis*.

The dysentery of Hongkong is said to be chiefly amœbic in type. In Europeans it is seen much more

commonly in children than in adults 1,376 cases were treated between 1918-22 in the Tung Wah Hospital, and 301 in the same period at the two government hospitals. Ankylostomiasis seems to be far less of a problem in China than in India. In 1913, examination of the faeces of 1,045 persons at the civil hospital gave only a 4.4% incidence of ankylostomiasis, and of 550 persons in 1917 a 22% incidence. Anaemia and debility are not important causes of the rejection of immigrants and not more than some 15% of the population of South China appear to be infected,—probably owing to the Chinaman's relatively cleanly habits. The leprosy problem is also different in China from the same problem in India. The Chinese ostracise a leper at once, whereas the Indian has no dread of the disease. The Chinese voluntarily segregate their lepers in isolated leper villages. On an analysis of the facts Dr Johnson raises the fish-eating theory of infection with leprosy, first advanced by Sir J Hutchinson but we think that few will agree with him.

Venereal diseases shew slight if any increase, and what increase there is appears to be due to better and more careful diagnosis and treatment of recent years. Here Dr Johnson pleads for the institution of special venereal disease dispensaries. Malaria accounted for 921 admissions in 1922 and is apparently on the increase. Quite 95% of the cases on microscopical examination were shewn to be due to *P. falciparum* and a useful list of all the local anophelines is given. Special attention is drawn to the clinical symptoms of subtertian malaria in young children, cerebral complications are very prevalent, coma, hyperpyrexia, convulsions, aphasia and pareses, but it is doubtful whether true blackwater fever has ever been seen in the colony, although several suggestive cases have been reported.

Turning to institutions, the civil hospital was in charge of Dr W B A Moore and Dr C W McKenny in turn and dealt with 4,447 in-patients and 25,892 out-patients in addition to antirabic and vaccine lymph inoculations. 820 operations were performed the most frequent being amputations, removal of tubercular glands and benign tumours, appendicectomy and skin grafting. 4 splenectomies were done during the year, but information is not given as to the reasons for this interesting operation or its results. The police force in Hongkong consists of 188 Europeans, 431 Indians and 762 Chinese. It shewed a total of 994 admissions to hospital, and it is rather remarkable that the 431 Indians shewed no less than 556 admissions to hospital during the year,—186 of them for malaria. At the University qualified Chinese graduates have now been appointed to act as house physicians and house surgeons. During the year the Rockefeller Foundation endowed chairs of surgery, medicine and obstetrics at the University—(luckily Hongkong!),—and Mr K H Digby M.B., F.R.C.S. and Dr J Anderson, M.P. were selected for the first two of these appointments. The Maternity Hospital admitted 721 patients for labour, with 586 live births, 32 still born and 103 abortions. 7 maternal deaths occurred, 2 from nephritis, 2 from eclampsia and one each from plague, eclampsia and shock. The Lunatic Asylum admitted 235 patients, of whom 117 were brought in by the police, most of them having been found wandering at large, whilst the head attendant of the London County Mental Hospital was appointed as head attendant and arrived in Hongkong during the year to take up his new duties. Many of the cases admitted are probably sent into the colony from outside by relatives who hope that they will be found and admitted.

At the Victoria Gaol Hospital Dr A R Esler was in charge. 5,014 prisoners were in custody during the year, the daily average being 787 with a daily average 76 in hospital. The chief hospital in Hongkong is the Tung Wah Hospital, which is run by Chinese medical graduates under a visiting European government medical officer, and which treated 8,336 in-patients and 168,951 out-patients during the year.

The diseases most commonly seen here were beriberi, phthisis, influenza, plague and syphilis. The death rates in 1922 were 44% of 846 beriberi cases, 88% of 464 plague cases, 50% of 656 cases of phthisis, whilst it is noted that influenza seems to be more persistent in Hongkong than in many other quarters of the world. At the Bacteriological Institute Dr C Y Wang, M.R.C.P., D.T.M. & H., was in charge and the routine work was very heavy. This department prepares antirabic vaccine and examined no less than 32,333 dead rats during the year, of which only 19 were found to be plague infected. At the public mortuaries 3,973 post-mortem examinations were carried out and interesting points are the relative rarity of abdominal infection found in persons who had died from phthisis, and the apparently very low mortality amongst dysentery cases.

A maternity hospital for Chinese with 60 beds was opened during the year and 7 Chinese midwives are employed with 6 others in training. In 1922 some 2,800 Chinese patients were attended in childbirth in various medical institutions in the colony, and although the number is relatively small, it is some three times the number that used to come forward for such attendance five years ago. In Hongkong Port there are two Health Officers, Dr F T Key and Dr B H Mellon. 5,318 sea-going vessels were inspected during the year as against 3,778 in 1921, and 27,900 passengers and 22,503 members of crews. 286 ships arrived in quarantine and of 11 vessels detained for further measures 8 were for small-pox, 2 for plague and 1 for cholera on board. No less than 98,410 emigrants passed through the port during the year and 1,036 of them were rejected for various reasons, amongst which trachoma and scabies figure prominently.

Suggestions put forward in the report are for providing a new infectious diseases hospital for the appointment of a medical officer to specifically supervise the work of the Chinese hospitals and dispensaries, for the establishment of a separate venereal diseases institute, a segregation hospital for cases of infectious diseases from board ship, a second medical officer for Kowloon and the New Territories and for a medical officer with special ophthalmological qualifications. Dr Johnson's report is interesting in its presentation of medical problems and questions about intermediate in character between those of the tropics and those of the temperate zones.

#### ANNUAL ADMINISTRATION REPORT OF THE ASANSOL MINES BOARD OF HEALTH FOR THE YEAR 1922-23

THE Administration Report of 1922-23 of the Asansol Mines Board of Health is very interesting. The activities of the board include—

(a) *Rural Sanitation*—The investigating staff of the Board kept in close contact with the educated village leaders and induced them to co-operate in the notification of births, deaths and outbreaks of epidemic disease, especially cholera and small-pox, in the measures for the protection of water supplies and the promotion of vaccination.

The system for the notification of infectious diseases worked admirably during the year.

(b) *Suppression of epidemics*—Cholera is the most dreaded disease of the colliery area. For the purpose of the report cholera is defined as 'a communicable disease characterised by purging, vomiting, muscular and intestinal cramps and suppression of urine'. This definition is purely clinical and it probably includes other diseases also, though the mortality rate of 52.11% indicates that the severity of the disease group corresponds to that of cholera.

The mixture\* already described by Dr Tomb in the *Indian Medical Gazette* of June 1923 p 258 was used with great success both in prevention and treatment. All the outbreaks which were dealt with were successfully checked.

The greatest cause of death is from respiratory diseases next comes fever and next dysentery and diarrhoea.

*Inoculation*—There were no deaths from small-pox during the year.

There was no plague during the year.

There was exceptionally little malaria during the year.

The vital statistics are of great interest the birth rate was 28.02 the death rate 18.4 and the infant mortality 145.7.

In Calcutta the corresponding figures were birth rate 19.29 death rate 20.02 and the infant mortality 330.

These figures speak for themselves and it is encouraging to find that Dr Tomb actually ventures to compare the figures for his area with those of the United Kingdom. It is true that the death rate and infant mortality rate are still a good deal higher in the Assam area but they are coming within sight of the British figures.

The activities of the Assam Mines Board of Health and of their enthusiastic Health Officer form a model and an incentive to other places in India.

This report should be distributed all over India if only to show what can be done to control preventable disease even under the unfavourable conditions which prevail in India.

#### MEDICAL INSPECTION OF STUDENTS LUCKNOW UNIVERSITY, 1922-23

The following extracts are made from an interesting report on the Medical Inspection of Students of the Lucknow University 1922-23 by Dr Banarsi Das, M.B.B.S. F.M.S., Medical Officer of the Lucknow University.

"Of the 333 students who appeared for medical inspection 252 were Hindus, 75 were Mohammedans and 6 belonged to other classes, viz Parsi, Christian etc. The schedule brings out the main features of this year's inspection—

##### 1922-1923

The total number of students examined was 333. The Hindu students examined were 252, of these 167 were married. There were 75 Mohammedans, of whom 26 were married. Defective vision was found in 133 and defective teeth in 90. Sixty-four were habitual smokers, 163 were *pan* chewers, 158 were vegetarians, the rest lived on a mixed diet.

There were 9 cases of definite pyorrhoea and 34 of spongy gums which may lead to a pyorrhoeic condition. Decayed teeth were noticed in 47 cases. Half the students habitually chew *pan* (some of them 10 to 20 in a day) and of the other half many do so 'only occasionally'. While I do not hold the *pan* alone responsible for all teeth troubles there is little doubt that it must aggravate such troubles, when they come. In fact the practically universal condition of septic mouth which one sees in elderly people with the *pan* habit, confirms this view. In many cases the constant chemical and mechanical irritation of the delicate lining membrane of the cheeks and the tongue leads to cancer.

* R	Spt. Aether	m 30
	Ol Cloves	} aa m 5
	Ol Cayuput	
	Ol Juniper	
	Acid Sulph Aromat	m 15
	Misce	

*Dose*—One drachm, in half-an-ounce of water every half hour until vomiting and purging cease (This generally takes place after 5 or 6 doses.)

Apart from those who smoke 'very seldom' or 'only when offered' 22 per cent have the smoking habit. Cigarettes are universal. The highest record is 20 a day. The holder of this record had a quick palpitating heart and a typical smoker's throat. The average cigarette consumption of many comes to 10 a day and a large proportion of these showed signs of throat irritation. In most cases the cheapest cigarettes are used which only serve to do more harm. No one uses intoxicants except two who take alcohol and one who uses *bang* on rare occasions.

Practically every one has had 'malarial fever' but not one case of enlarged spleen was detected. Headache and toothache have also been put down in the personal statement of nearly all students. This is not to be wondered at when one considers the high incidence of eye defects and tooth troubles.

Among skin diseases only about a dozen cases of ringworm and tinea versicolor were observed, which should readily yield to treatment. As the height and weight of each student examined were carefully recorded it is now possible to work out the ratio between them. This was a unique opportunity of observing these data in a large group of healthy young men of about the same age. I have gone through the records with the greatest care to strike the averages, and make an attempt to fix a standard of height and weight for this part of the country, which so far as I know has not been done before.

The ratio established is 1 foot of height to 217 lbs of weight—

Height		Average weight	
Ft	in	St	lbs
5	0	7	10.5
5	1	7	12.3
5	2	8	0.1
5	3	8	1.9
5	4	8	3.7
5	5	8	5.5
5	6	8	7.3
5	7	8	9.1
5	8	8	10.9
5	9	8	12.7
5	10	9	0.5
5	11	9	2.3
6	0	9	4.1

It will be interesting to compare these figures with those worked out for European countries as in the following Table—

Height		Lucknow average	European average
Ft	in	Stones	Stones
5	2	8	7.3
5	6	8½	9.3
5	10	9	11.6
		(5 ft 8 in)	

As the Lucknow figures are derived from men between the ages of 19 and 25 it is only fair to remember that the European averages quoted above must be considered along with a greater variation in age. The European standard weight of 7.3 stone with a height of 5 ft. 2 in is reached at 15 years, 9.3 stone with 5 ft. 6 in at 17, and 11.6 stone with 5 ft 8 in at 30.

In my group of young men between 19 and 25 years of age the average height comes to 5 ft 2 in and weight to 8 stones. In the European group between the same ages, the average height is 5 ft. 7½ in and weight 10 stones 6 lbs.

The comparative table demonstrates the difference between the average weights of the European and the Indian to the disadvantage of the latter for a height of 5 ft. 6 in or more. For a height of less than 5 ft. 6 in the Indian boy seems to have a slight advantage. But this is more than compensated for by the fact



that the European gains his 5 ft. 2 in at 15 years of age for which 7 stone is a very good weight, whereas the Indian weighs a little more for the same height when he is about 20 years old. There is no doubt that the Indian boy measures and weighs less than the European average at 15 as he does right through.

Buchanan gives the average weight of a Bengali at 109 lbs. Lewis gives under 110 lbs as the average weight of U P men. The average weight worked out in this series of cases is 112 lbs.

The greatest weight recorded is 14 stone with a height of 5 ft 5 in in a Bengali student 22 years of age, and the lowest 6 stone 2 lbs with a height of 4 ft 9 in in a U P man of 19."

## Correspondence.

### INSULIN IN THE TROPICS

To the Editor "THE INDIAN MEDICAL GAZETTE"

SIR—You will be interested to know that we recently sent home for test a quantity of 'Wellcome' brand insulin taken at random from the first supply received in this country.

The results of the test were entirely satisfactory and they indicate that there is no necessity for employing cold storage during transit to India for 'Wellcome' brand insulin. We mention this as a communiqué appeared in the *Calcutta Statesman* last week reporting that cold storage in transit was considered essential by the authors of the communiqué in question—Yours, etc.,

BURROUGHS WELLCOME & CO

BOMBAY

8th February, 1924

### THE DETERIORATION OF INSULIN IN INDIA

To the Editor, "THE INDIAN MEDICAL GAZETTE"

SIR—Since writing the note under the above title published in the *Indian Medical Gazette* of March 1924 I have received a communication from the Medical Research Council, who have kindly made a full enquiry with reference to the special batch of insulin with which that series of experiments was conducted. It appears that that special batch was turned out under conditions which mitigated against its full potency being attained and against its potency being preserved over a long period of time—so that the results of the experimental work undertaken can only be read with reference to that special batch, and cannot be accepted as evidence of the extent to which the present supply of insulin to India deteriorates in the hot weather,—if indeed it deteriorates at all. The cause of the inefficiency of that special batch of insulin has been determined—and it may be accepted that that cause will not be repeated in the future. In the meantime a series of experiments have been arranged through the cooperation of the weather between the Pathological Department of King George's Medical College, Lucknow, and the Medical Research Council in London which will result in more definite evidence in this important question as to the extent of the deterioration of insulin in India—Yours, etc.,

H STOTT,  
Major, I.M.S.

KING GEORGE'S MEDICAL COLLEGE  
LUCKNOW  
27th February 1924

### BENGER'S FOOD

To the Editor "THE INDIAN MEDICAL GAZETTE"

SIR—It has been brought to our attention on more than one occasion recently that in India old stock of Benger's Food is being offered for sale by auction and in other ways at much reduced prices. Benger's

Food sold in this way is old stock, and in some cases represents surplus war stores.

It is most emphatically not our wish that this should be consumed after so long a time, and so we are taking steps to inform the medical men in India of this practice, asking them to warn their patients to use only the recent stocks which are available from dealers of repute in India.

We have prepared an advertisement to this effect, and are having it inserted in your paper. If you can support this endeavour by editorial notice we feel sure that nothing but good can come of it.

May we count on your kind co-operation please?—Yours, etc.,

OTTER WORKS,  
MANCHESTER

30th January, 1924

BENGER'S FOOD, LTD

### THE BRITISH EMPIRE EXHIBITION

To the Editor, "THE INDIAN MEDICAL GAZETTE"

SIR—We believe there will be a number of Indian medical men visiting London this year on account of the British Empire Exhibition and we should esteem it a favour if you would insert a notice in your next issue to the effect that we offer gratuitously to receive letters and parcels at our address and give them any advice with regard to purchases they may wish to make, and assist them in any way we can during their stay here.

Thanking you in anticipation—Yours, etc.,

THE HOLBORN SURGICAL  
INSTRUMENT CO. LTD

26, THAVIA'S INN,

HOLBORN CIRCUS, LONDON E.C. 1

14th January, 1924

## Service Notes.

### APPOINTMENTS AND TRANSFERS

LIEUTENANT-COLONEL J. D. GRAHAM CIE, MB, I.M.S. is appointed to officiate as Public Health Commissioner with the Government of India with effect from the 2nd February 1924.

Major A. Denham White, MB, F.R.C.S. I.M.S. Civil Surgeon is transferred from Chittagong to Midnapore.

The services of Captain A. M. V. Hesterlow, I.M.S., are placed temporarily at the disposal of the Government of Madras with effect from the date on which he assumes charge of his duties.

Captain D. R. Thomas I.M.S., is appointed as Chemical Examiner to the Government of the Punjab, with effect from the date on which he assumed charge of his duties.

The services of Captain B. F. Emmison, I.M.S. are placed temporarily at the disposal of the Government of Bombay, with effect from the 29th November 1923.

The services of Captain C. McIver and C. H. P. Allen, I.M.S., are placed temporarily at the disposal of the Government of Assam, with effect from the dates on which they assume charge of their duties.

The services of Captain D. Clyde, I.M.S. are placed temporarily at the disposal of the Government of the United Provinces, with effect from the date on which he assumes charge of his duties.

Captain (now Major) C. Newton-Davis, MC, MB, I.M.S., to be acting Major whilst holding appointments with the Egyptian Expeditionary Force from 7th June 1918 to 28th August 1919.

### LEAVE

MAJOR-GENERAL B. H. DEARE CIE R.H.S., I.M.S., Surgeon-General with the Government of Bengal, is granted leave for 6 months, with effect from the afternoon of the 26th February 1924, the date on which he vacates his appointment of Surgeon-General on retirement.

# Diet and Resistance

THE School diet is too often deficient in those food elements that strengthen the resistance to infection and that minister to growth and development.

It is essential that the diet in winter should be supplemented by animal fats that are rich in Vitamins and easily digested.

The resistance of the body to Colds, Chills, Influenza, etc., is maintained by the addition of Virol, which restores the balance so often lacking in the diet of children of school age.

Virol not only assists the development of the body generally, but also directly nourishes the brain and nervous system during the age of strain. The digestibility of Virol is an important feature. Virol is very palatable.

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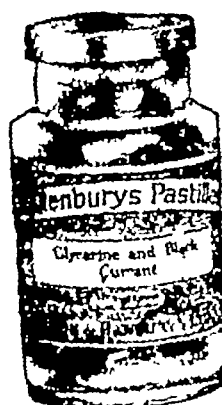


# The 'Allenburys' PASTILLES

## Glycerine and Black Currant Pastilles

*Delicate in flavour      Efficient in use*

They are manufactured from pure glycerine and the fresh juice of choice ripe black currants by a special process which conserves the full value and flavour of the fruit. The 'Allenburys' Glycerine and Black Currant Pastilles have a demulcent and mildly astringent effect, most useful in allaying simple irritations of the throat. They dissolve slowly and uniformly, and have a delicious and slightly acidulous flavour.



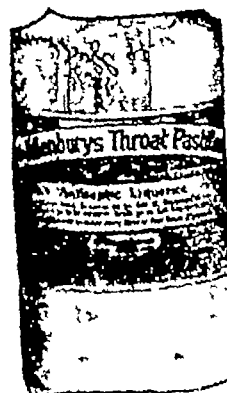
Supplied in glass bottles containing 2 ozs., 4 ozs., 8 ozs. & 1 lb. respectively

## Menthol & Eucalyptus

(No. 54)

Menthol  $\frac{1}{2}$  gr      Eucalyptus Oil  $\frac{1}{4}$  min in each

A useful antiseptic pastille particularly applicable in the treatment of pharyngitis, laryngitis and influenza



Packed in glass bottles containing 3 ozs., 8 ozs. and 1 lb. respectively.

## Antiseptic Liquorice

(No. 71)

Menthol  $\frac{1}{2}$  gr      Thymol  $\frac{1}{2}$  gr  
Benzolic Acid      Ammonium Bromide  $\frac{1}{2}$  gr  
Eucalyptus Oil  $\frac{1}{4}$  min      Ext. of Liquorice 5 grs. in each

A valuable compound for laryngitis and for other throat affections complicated with bronchitis and cough

*Descriptive Booklet and Price List sent on request to members of the Medical Profession*

# Allen & Hanburys Ltd.

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A. H. P. JENNINGS, Block E, 2nd Floor, Clive Buildings, CALCUTTA.

Lieutenant-Colonel H. M. H. Melhuish, I.M.S., Acting Director of Public Health, is granted leave for 6 months with effect from 31st March 1924 or the subsequent date of relief.

Lieutenant-Colonel G. I. Stewart, I.M.S., is granted, with effect from 20th March 1924 or from the subsequent date of relief, leave for 8 months combined with leave for 1 year 5 months and 6 days pending retirement.

Major A. G. Coullie, I.M.S., is granted with effect from 20th March 1924 or from the subsequent date of relief leave for 8 months combined with leave for 9 months and 16 days pending retirement.

Major R. B. Seymour, S.M.S., Surgeon Naturalist Marine Survey of India is granted study leave for 8 months and 15 days with effect from the 10th May 1924 or such subsequent date as he may avail himself of the leave.

Captain S. L. Bhattacharya, M.A., M.S., Professor of Physiology, Histology and Hygiene, Grant Medical College Bombay, was granted leave for 1 month from 15th November 1923 and was allowed to prefix the October vacation to the leave. He is also allowed to return to duty when on his appointment during the leave.

#### PROMOTIONS

##### Lieutenant-Colonel to be Major-General

Thomas Henry Symon, I.M.S., Major-General Sir Gerald Godfrey Giffard, I.C.S., retired, with effect from the 10th January 1924. Major-General Symon's tenure of appointment will reckon from this date.

##### Majors to be Lieutenant-Colonels

W. F. Braine, M.B., S. W. Jones, O.B.E., I. Anderson, M.B., G. G. Hirst. Dated 30th January 1924.

##### Captains to be Majors

Philip John Veale, M.P., H. Rajee Ichangir Manockjee Cursetjee, D.S.O., M.B., Peter Fleming Gow, D.S.O., M.B., John Simson Stuart Martin, M.B., James Walker Jones, D.S.O., M.B., James Hall Halsey, M.C., M.B. Dated 27th January 1924.

##### Captains to be Majors

Laurence Alfred Pelham Anderson. Dated 27th January 1924.

William Calder Paton, M.C., M.B., F.R.C.S. Dated 27th January 1924.

James Bennett Hance, O.B.E., M.B., F.R.C.S. Dated 27th January 1924.

Graham Yalden Thomson, M.B. Dated 27th January 1924.

Colm McIver. Dated 27th January 1924.

##### Lieutenant to be Captain (Provisional)

Perceval Arthur Chas. Davenport. Dated 21st April 1923.

##### Admissions to the Indian Medical Service

###### To be Captain

M. P. Atkinson. 29th November 1923.

###### To be Lieutenants

W. Lawie, R. I. Innton, F. G. Michelson, H. W. Mulligan. 29th November 1923.

C. J. Joyce, J. D. O'Neill, M. F. D. Graham, T. J. Davidson, A. Tait. 22nd December 1923.

#### RETIREMENTS

Major-General W. E. Jennings, M.D., K.H.P., I.M.S. Dated 11th January 1924.

Lieutenant-Colonel Stanley Arthur Harris, M.B. Dated 29th January 1924.

Lieutenant-Colonel J. Entrican, C.I.F., M.D., I.M.S. Dated 27th March 1923.

#### RESIGNATION

Captain A. G. Cowper, I.M.S. Dated 30th December 1923.

##### Relinquishment of Rank

Major G. L. Duncan, I.M.S., relinquished the acting rank of Lieutenant-Colonel on ceasing to command a Combined Field Ambulance, on 9th November 1922.

Captain (now Major) R. F. Flowerdew, I.M.S., relinquished the temporary rank of Major on ceasing to be employed as Deputy Assistant Director of Medical Services on 20th May 1920.

## NOTICES.

### LONDON SCHOOL OF TROPICAL MEDICINE EXAMINATION RESULT 73RD SESSION SEPTEMBER-DECEMBER 1923

#### With distinction

Wright, A. D. (Malaya Medical Service)—Winner of the "Duncan" Medal.

Duncombe, N. D.

Lee, H. B. (W. African Medical Service)

Mills, P. S. (Indian Medical Service)

McRobert, G. R. (Indian Medical Service)

Graham, M. J. (Malaya Medical Service)

Tirumurti, T. S. (Madras Medical Service)

Barrada, Y. A. (Egyptian Medical Service)

Watters, Miss H. S.

Garnett, D. G. (Uganda Medical Service)

Bhandari, M. G. (Indian Medical Service)

Hearne, A. A. (Jamaica Medical Service)

Wilmoth, C. L. (American Board of Foreign Missions)

Paterson, W. L. (Hongkong Medical Service)

Duncombe, W. K.

Seethapathy, T. (Madras Medical Service)

Kharegat, R. M. (Indian Medical Service)

Angstein, L. (Epidemiological Institute, Warsaw)

Neill, J. H. (Uganda Medical Service)

Basu, P. N. (Indian Medical Service)

Moriarty, J. J.

Findlay, J. (Indian Medical Service)

Hennessy, D. R. (Malaya Medical Service)

Bellas, J. S. (Kenya Medical Service)

Dort, H. C. Van (Ceylon Medical Service)

McCulloch, W. E. (W. African Medical Service)

Cooke, F. H. (W. African Medical Service)

Dhurandhar, Miss J. V.

Covne, A. E.

Kapoor, J. L.

Das, Hari (Indian Medical Service)

Lindberg, K.

Perera, R. P. (Ceylon Medical Service)

Sen, Miss Y.

Kassem, A. (Egyptian Govt. Medical Service)

Shaikh, A. H. (Indian Medical Service)

Phillips, C. H. (Tanganyika Medical Service)

Forde, J. R. (W. African Medical Service)

Austin, C. J.

Burke, H. L. (American Board of Foreign Missions)

Skeen, D. T. (Malaya Medical Service)

Bramhall, C. (Lieut.-Col., R. A. M. C. ret'd.)

#### MARGOSIC PREPARATIONS

THE Calcutta Chemical Co., Ltd., 35-1, Panditra Road Pallygunge Calcutta, are issuing free of charge a small pamphlet in which the different preparations from the margosic acid of the neem tree are described, and their uses and properties given. *Neem* has long been valued for its antiseptic qualities, and the work of Dr. K. K. Chatterji on the isolation of its active principles will be known to our readers. The list includes preparations for oral intunction, and intramuscular use, and a bibliography of the literature on subject.

#### A NEW DARK GROUND ILLUMINATOR.

DARK ground illumination has become so much a routine method in the examination of living organisms, that any improvement or advance in its construction is sure to attract attention.

With the dark ground illuminators hitherto in use, it has been necessary to reduce the numerical aperture—that is, the working efficiency—of the oil immersion

objective by the insertion of a cutting down stop from the back of the objective.

The new "Cassegram" oil immersion dark ground illuminator obviates the necessity for this, for it will work with the full aperture of any objective from 0.60 to 1.30 n.a. This means that with the higher power objective the full resolving power of the lens is for the first time available with dark ground illumination, and whereas with the inserted funnel stop which has hitherto been used cutting the lens down to 1 n.a. only 95,740 lines per inch would be visible with white light, with the full aperture of 1.30, this divisibility or resolving power is increased to 117,746 lines per inch.

It will be readily recognised that the potential advantages of this increased effect may be very great. It is claimed for it that it is not so sensitive to thickness of the cover-slip, and that it can be used with an ordinary electric bulb or oil lamp.

The Cassegram illuminator is made by W. Watson & Son Ltd., at 313 High Holborn London W.C., from whom full particulars can be obtained.

#### NEW DEPARTURES IN X-RAYS

We have recently received from Messrs Watson & Sons (Electro-Medical), Ltd, Sumic House, Kingsway London, W.C.2 notes of several interesting items with reference to X-ray work.

The first is an exposure card table giving, on one side exposures for double coated films and on the other for X-ray plates. This represents an attempt to standardise technique so that results may be made as comparable as possible. The importance of such universal standardisation cannot be over-estimated, and it is only by means of such exposure tables that it is possible to do this. The exposure are based on a subject of average weight, and any considerable variation will necessitate a slight increase or decrease of the exposures given. The cards are neat, easily legible, with a highly polished surface, and will be found very useful by radiologists.

A second item is a brochure dealing with dental X-ray apparatus. This includes a description of the "Sumic" dental transformer outfit, consisting of a small oil-immersed high tension transformer enclosed in a steel tank, a small transformer for regulating the current required for the heating filament of a Coolidge tube,—the former being enclosed in a mahogany cabinet,—a milliamperemeter, and a tube stand with a very easily adjustable arm. Two different patterns are listed for alternating and for continuous current respectively the former at £86 and the latter at £116. A special type of Coolidge tube for dental radiography with the cathode at one side, thus enabling the negative part of the tube to be brought close to the patient without danger, is listed at £40, and some very fine dental radiographs show what excellent results have been secured with it. The "X-ograph" dental films appear to be ideal, they are thin, impressionable and backed with metal, and thus allow of free and easy manipulation in the mouth, whilst there are no seams or folds to absorb saliva and the ductility is such that they conform snugly to the curves of the mouth. Other ingenious apparatus mentioned is a viewing box for dental radiographs, a magnifying radioscope, and a special dental portable developing outfit.

The third item is a brochure dealing with the "Sumic" intensifier screens with waterproof surfaces. The waterproofing is not accomplished by a layer of waterproofing material over the screen, but by providing a waterproof surface of a new composition. The new screen combines the advantages of speed, freedom from grain and durability. An account is also given of back and front intensifier screens, which are issued in packets, marked "front" and "back" and are suitable for use with Duplitized films.

#### CHEMISTS' EXHIBITION, LONDON, 1924

The 27th Chemists' Exhibition will be staged on June 23rd-27th next in the Central Hall, Westminster, London.

It is purely a trade Exhibition and will represent the latest advances in drugs, medicines, sick appliances and the innumerable sundries which go to make up the stock of the modern drug store. Members of the drug trade should time their visit to the Old Country this year to take in this fixture which it is the ambition of every pharmacist to see. Each year the visitors include many from the drug trade of the Dominions and Colonies, and the number this year is expected to be large. Admission will be obtained on presentation of business card. The Exhibition is organised by the "British and Colonial Pharmacist."

#### ANTIPLIOLOGISTINE

We have received from the Denver Chemical Manufacturing Company, the makers of "antiphlogistine," a very well got up little booklet, entitled "Pregnancy, its signs and complications." This summarises in pictorial form the signs and differential diagnosis of pregnancy, the disturbances of lactation and of menstruation, mammary complications, vulval and rectal disorders, and vesical disorders of pregnancy.

Accompanying this are sets of instructions for the use of antiphlogistine in many different obstetric and gynecological disorders. Thus for mammary abscess, fissured nipple, hemorrhoids, adenitis and phlegmasia alba dolens, antiphlogistine provides a soothing and valuable dressing, whilst used at a vaginal tampon it is of marked value in dysmenorrhœa.

The Denver Chemical Manufacturing Co., 20-24, Grand Street, New York, U.S.A., are ready to send a copy of this quite useful little booklet to any physician upon request.

#### HORLICK'S MALTED MILK

The progress of dietetics and pediatrics during the past fifty years has left the position of Horlick's Malted Milk unassailable. This is the original malted milk, and is still a useful food for all ages.

Professional men and those who make infants' and invalids feeding a special study, regard the maltose-dextrines in combination with pure milk as the nearest solution of this difficult problem.

It is a final maltose-dextrin modification of milk, containing the soluble extracts of specially selected malted barley and wheat with the ideal proportion of milk solids. The correct balance of fats, carbohydrates and proteins, the high quality of these constituents and their ready assimilability are the factors which make it not only an ideal food, but a grateful and nourishing food drink at all times and a most reliable diet for infants and invalids.

It is invaluable in tropical climates.

#### Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints of the literary pages of the "Gazette" gratis, if asked for at the time of submitting their manuscripts.

REPRINTS OF THE ARTICLE CONCERNED (ONLY) IN PLACE OF REPRINTS OF THE WHOLE OF THE LITERARY MATTER OF THE ISSUE CAN BE SUPPLIED ON PAYMENT.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs Thacker, Spink & Co., P. O. Box 54, Calcutta.

Annual Subscription to "*The Indian Medical Gazette*," Rs 16 including postage, in India Rs 18 including postage, abroad.

# HEWLETT'S SPECIALS



## MIST. PEPSINAE CO C. BISMUTHO

(HEWLETT'S)

Useful in all forms of Dyspepsia, Pyrosis, Gastric Pain, and Vomiting, and for alleviating the pain in cases of Ulcer and Cancer of the Stomach

Dose — 3ss to 3i diluted

'Messrs Hewlett's preparation of Pepsin and Bismuth is of standard excellence. The combination is a particularly good one for the treatment of diseases of the stomach which require a sedative'

*Medical Review* August, 1905



## Liq. Santal Flav. C. Buchu et Cubeba

(HEWLETT'S)

Since its introduction it has been largely prescribed all over the world as specific in certain cases

Dose — 3i to 3ij in water or milk.

'Experience has shown this preparation to possess the same efficacy as Santal Oil itself'—*Practitioner*

## LIQUOR ERGOTAE PURIF. (HEWLETT'S)

PHYSIOLOGICALLY STANDARDISED.

Superior to the ordinary Liquid Extracts, etc.  
Reliable and Unalterable

"A very excellent preparation of the drug"

*Medical Times and Gazette*

"A reliable preparation of Ergot, and well adapted for obstetric practice"

*London Medical Record*

In 5, 10, 22, 40 and 90 oz bottles.



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## Bactro-Clinical Laboratory, Limited.

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The Best House in India for the  
Preparation of VACCINES, SERA  
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### INJECTION AMPOULES.

WASSERMANN reaction for  
"SYPHILIS" and Blood, Urine,  
Sputum and Stools, etc

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Our SODIUM ANTIMONY TART pre-  
parations have been declared most effective  
by the **Anti-Kala-Azar Society** at Dogachi  
where thousands of patients have been cured

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Wholesale and Retail  
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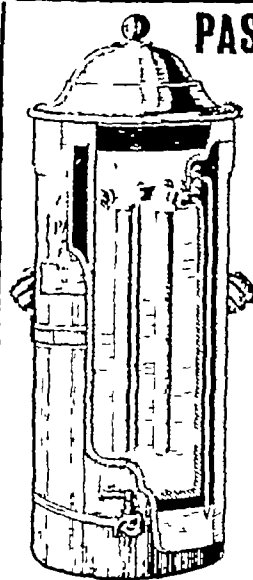
Telegrams "CHEMICUS," CALCUTTA

### Liverpool School of Tropical Medicine.

Courses of instruction (lasting three  
months) for the Diploma of the Univer-  
sity of Liverpool, and also in Veterinary  
Parasitology, commence about September  
15th and January 7th

All Indian medical degrees and diplomas  
registrable in the United Kingdom  
qualify for admission to the DTM  
examination

Prospectus from the Hon Dean, School of Tro-  
pical Medicine, Pembroke Place, Liverpool



### PASTEUR (CHAMBERLAND) FILTERS.

*Official Govt Statement —*

"Wherever the PASTEUR FILTER  
has been applied TYPHOID FEVER  
has disappeared"

Write for Price List "F Dept

Agents:—

**S. M. DEY & Coy.,**

Hardware, Iron and Metal  
Merchants,

41, Strand Road,  
CALCUTTA.

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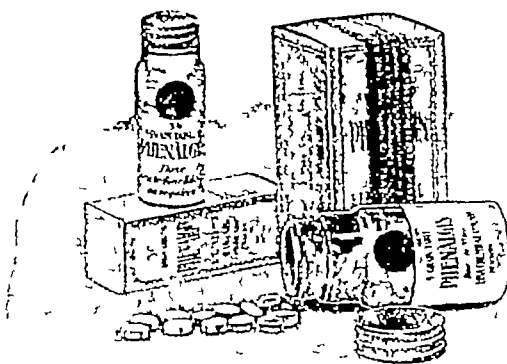
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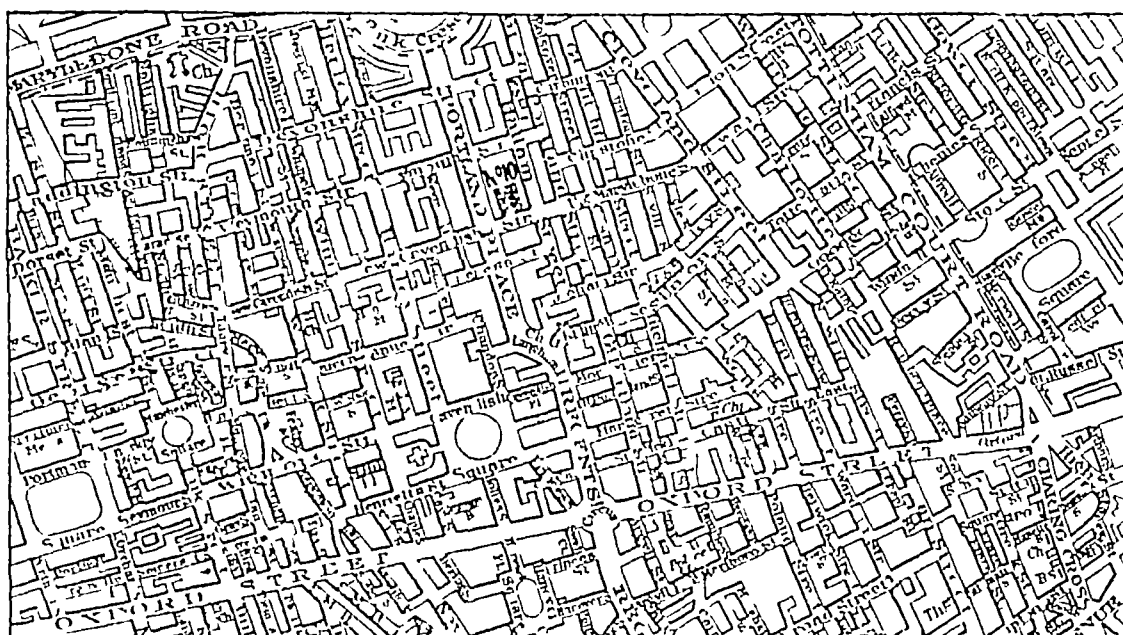
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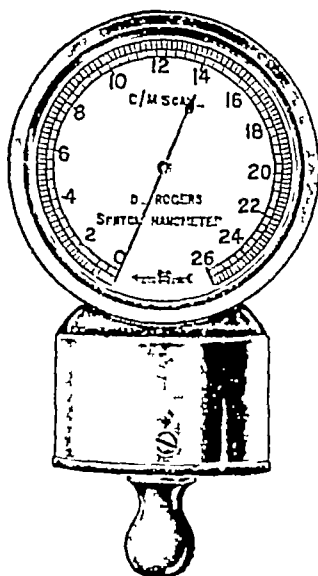
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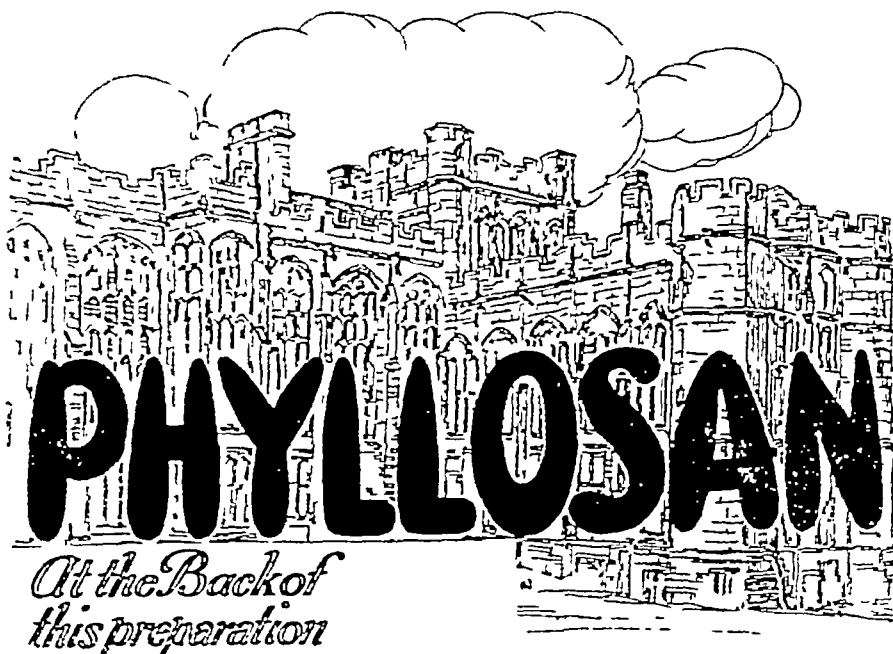
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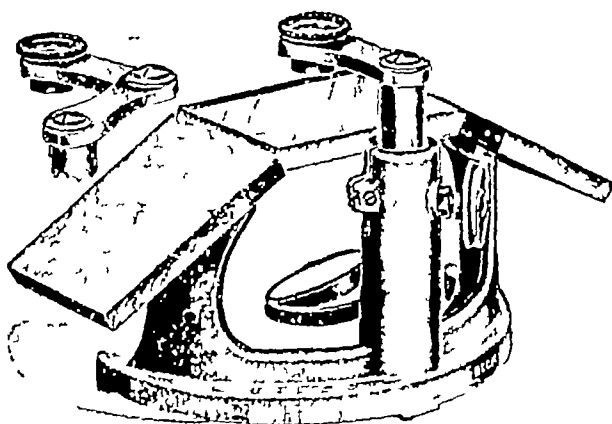
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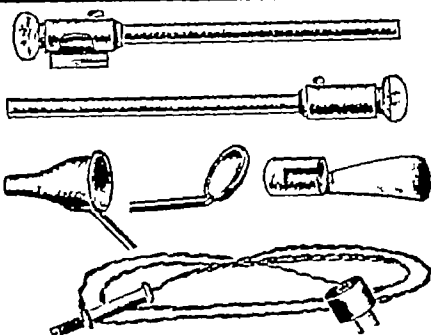
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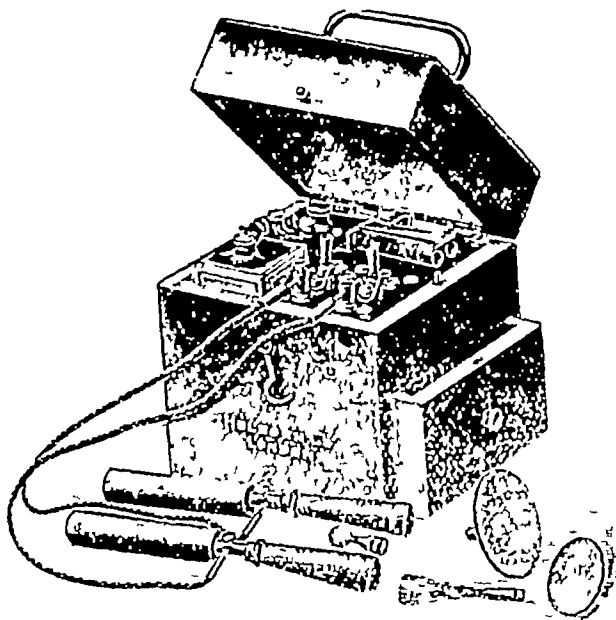
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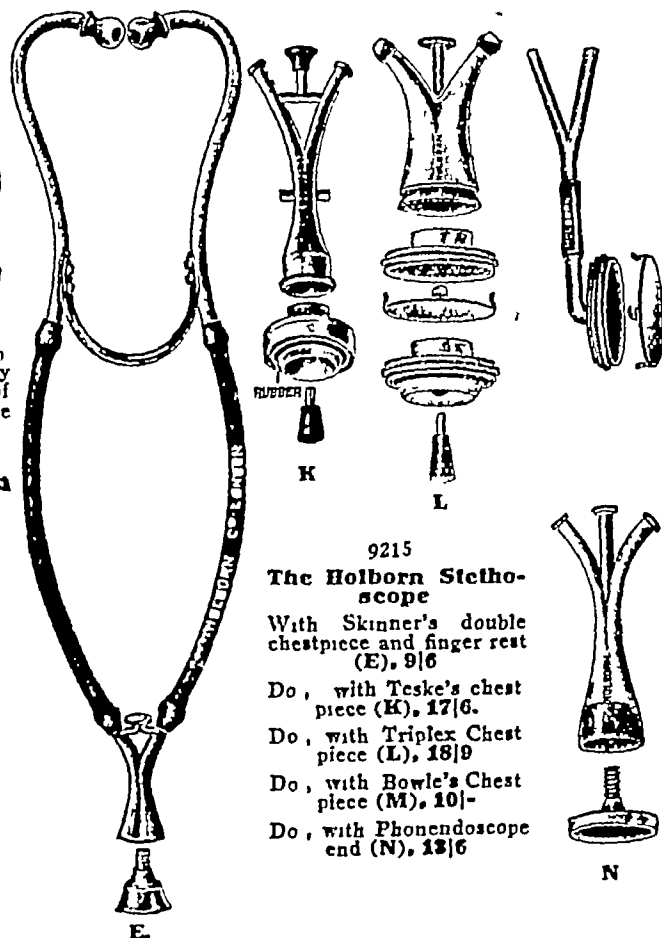
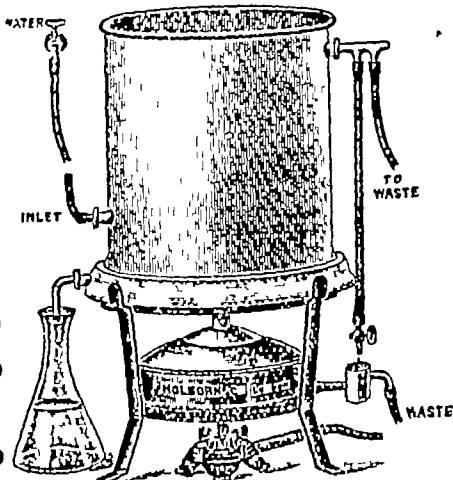
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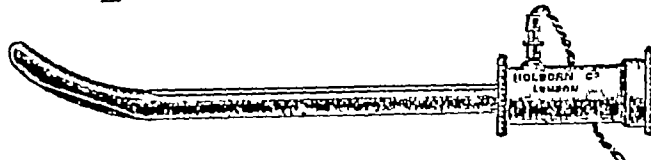
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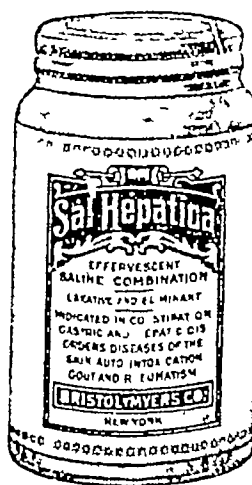
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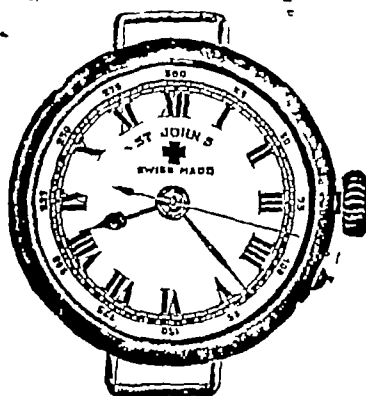
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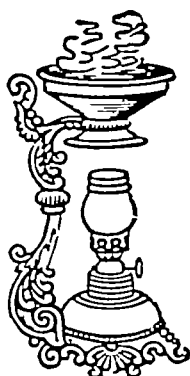
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To—Major London.

*Personal*

Remarks by the Supply Officer above in connection with the test made of Milton at the Supply Depot of this Station are forwarded please I might mention what I saw of one or two demonstrations made by Mr Smith, it could be used to a very great advantage for many purposes both in the Supplies and the Transport Sections of the C. A. S. C. It is by far the best disinfectant I have as yet seen and in view of the fact that fresh meat issues are about to be made, the butcher's shop is going to be not very far short of a slaughter house and as a disinfectant and fly exterminator for this particular purpose I would strongly recommend the purchase of Milton in this connection.

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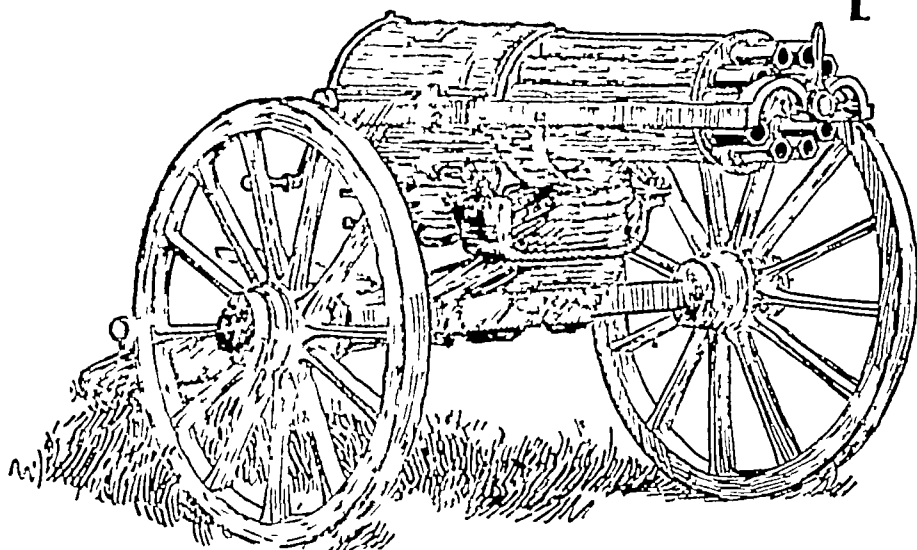
Distributing Agents—G. F. KELLNER & CO., 32, Chowringhee Road, Calcutta, who will send a free sample bottle to any members of the profession who are willing to try it. Mention should be made of the Indian Medical Gazette

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## HORMOTONE

by an eminent British physician



Hormotone has met with the approval of many leading clinicians. It is used for all conditions dependent upon adrenal insufficiency, as evidenced by asthenia, sensitiveness to cold and cold extremities, hypotension, weak cardiac action and pulse, anorexia, slow metabolism, constipation and psychasthenia.

A well-known American physician writes "No medicine of this character has ever before been devised that produces the uniformly good results that Hormotone does when used in suitable cases."

In neurasthenia associated with high blood pressure and all hypertensive conditions use

### **HORMOTONE WITHOUT POST-PITUITARY**

This preparation was mentioned very favourably by T. Bodley Scott, Esq., in *The Practitioner* for November, 1917. See page 481.

Dose of either preparation: One or two tablets three times daily before meals.

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# HORMONE THERAPY IN RUN-DOWN CONDITIONS

A hormone is a substance formed in any organ of the body which is carried by the blood stream to a more or less distant organ and arouses that organ to activity. This does not necessarily mean that the activity aroused is confined to that particular more or less distant organ itself, but rather that the activity is exerted for the good of the body as a whole. Thus, the thyroid secretion acts as a hormone on the ovary and the testis and the sexual glands in their turn help to define and maintain the secondary sex characteristics such as the distribution of hair, the pitch of the voice, etc. These secondary sex characteristics are thus in reality initiated in part, at least, by the thyroid secretion.

An illustration such as this enables one to realize that the inter-relationships of the glands of internal secretion are so many and so complex that it is often advisable to give the product of one gland for the effect it will have upon another gland, in other words, its hormone effect.

Again, it is often better to administer a variety of gland substances where there is every evidence that a patient is suffering from a general lowering of the tone of the body due to a partial insufficiency of function of the glands that make up the chain that links together the dynamic forces of the body.

Pluriglandular therapy is reasonable from a theoretic standpoint and in practice it has given very desirable results.

"The practitioner should grasp the idea that morbid states may be consequent upon pluriglandular insufficiency and this will encourage him to substitute multiglandular for monoglandular organotherapy on the same lines and for the same reasons that we employ polyvalent sera." Dardel (*The Present Status of Organotherapy*, *The Practitioner*, July, 1912).

"With polyglandular therapy I have not had very much experience, but since I have been using the mixture called Hormotone I have had considerable success in those cases just referred to as benefited by pituitary." Leonard Williams (*Discussion on Therapeutic Value of Hormones*, *Proc. Roy. Soc. Med.*, London, Jan 20, 1914).

"Much evidence has accumulated showing that disease of the ductless glands is usually plural rather than isolated and single. Pluriglandular disease is rather the rule than the exception. The use of gland extracts in the treatment of aplasias of the pluriglandular system has become an established therapeutic measure of miraculous potency." Bayard Holmes (*The Internal Secretory Glands*, *Lancet-Clinic*, Sept 19, 1914).

Hormotone is a well thought out combination of the hormones of the thyroid, pituitary, ovary and testis and as such represents a distinct step in advance in pluriglandular therapy. Each tablet contains 1/10 of a grain of desiccated thyroid and 1/20 of a grain of desiccated entire pituitary.

The systematic administration of Hormotone opens up a new era in organotherapy, and here one is following Nature's methods, for it is to be remembered that the blood is a pluriglandular stream conveying the hormones to the particular tissues or organs for which they are destined and on which they will exercise their specific effect.

In neurasthenia of the true asthenic type Hormotone has been very efficacious. Naamé in his *Studies in Endocrinology*, attributes neurasthenia to glandular hypo function. He says that the asthenia is of suprarenal and testicular origin. The low blood pressure and the headache associated with arterial hypo function arise from a suprarenal and pituitary deficiency. The irritability of temperament seems to be due to hypoparathyroidism and the cerebral depression due to hypothyroidism. Pluriglandular therapy, Naamé says, wisely selected and associated, acts efficaciously on each and every neurasthenic symptom. To use his own words "I can speak authoritatively because I myself constitute a definite example of serious neurasthenia accompanied for ten years especially with insomnia and mucomembraneous enteritis. I have used opotherapy and have made myself over from a glandular standpoint and am now in perfect health."

Physicians who use Hormotone in these run down conditions will be surprised and delighted with the good results obtained. The dose is one or two tablets three times daily before meals.

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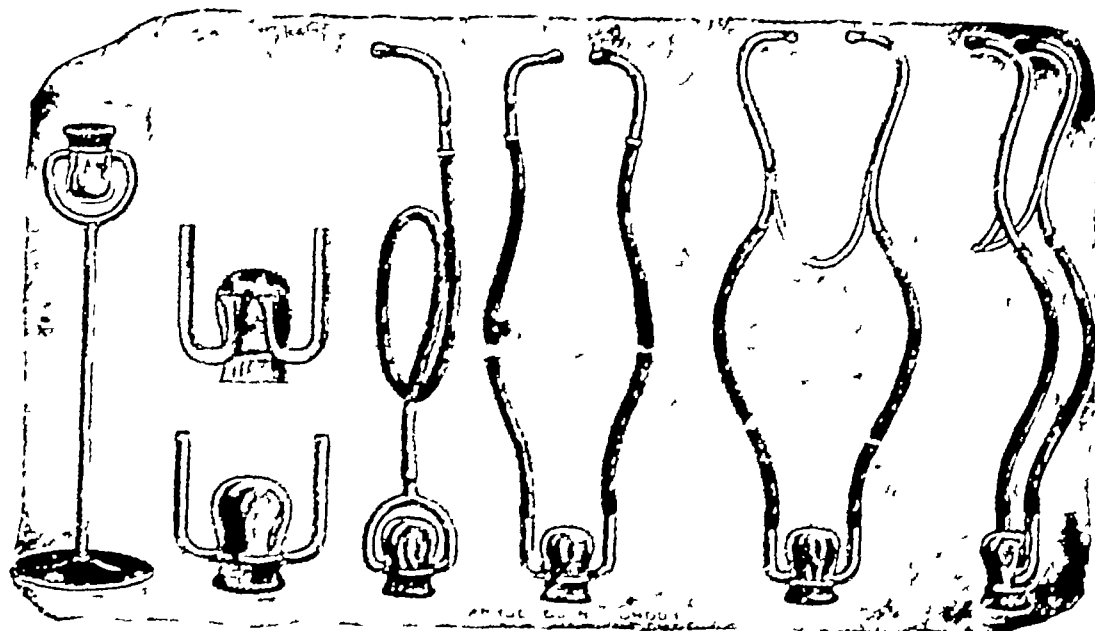
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(Fig B) 7/6  
Ditto Single flexible  
(Fig C) 9/6  
Ditto Double flexible  
(Fig D) 13/6  
Ditto Binaural  
(Fig E) 16/6  
Ditto Folding  
(Fig F) 17/6

FIG A FIG B FIG C FIG D FIG E FIG F

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DEAR SIRS — "I find that most certainly the chest sounds are rendered clearer and more distinct by your 'Phonophore' than by any stethoscope I have used during over thirty years work." — Yours, F. R. C. S.  
DEAR SIRS — "I may say I am very pleased with the Phonophore. It renders chest sounds more audible and more distinct than any instrument I have so far used." — Yours faithfully  
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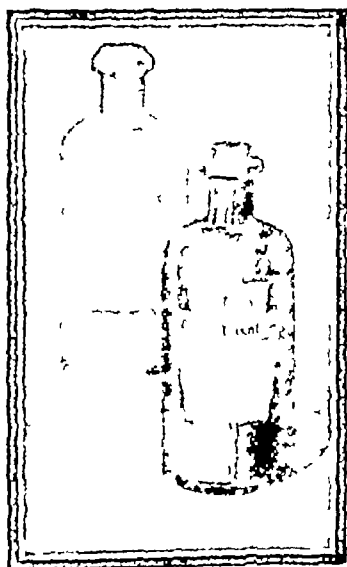


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**Dose**—Children, as a laxative, 5 to 20 minims three times a day before meals, as a cathartic, 20 to 40 minims night and morning.

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Casca-Laxative should be administered in cold water or followed by a copious draught of water.

Literature mailed on request

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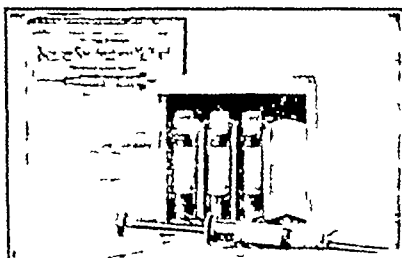
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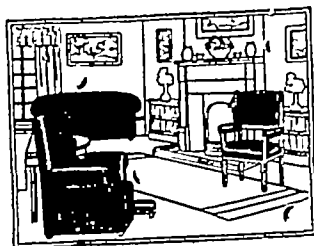
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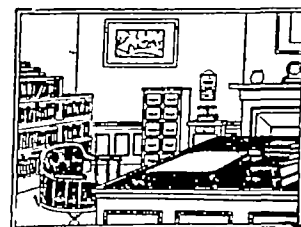
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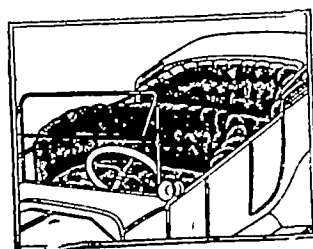
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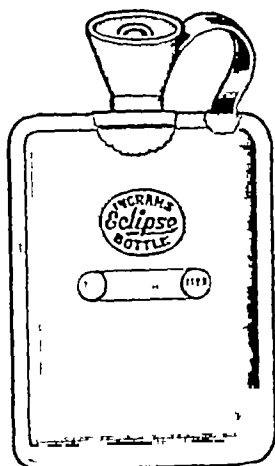
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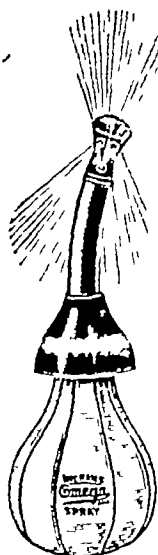
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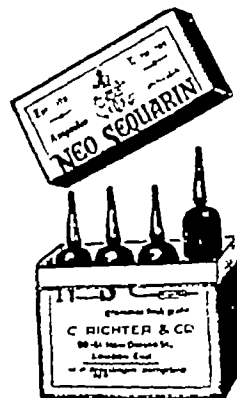
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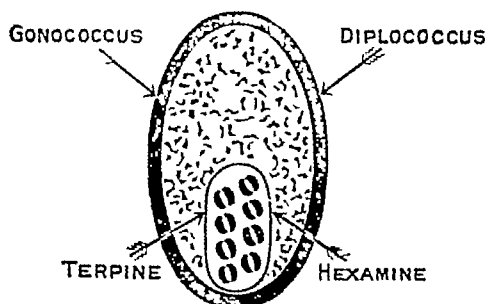
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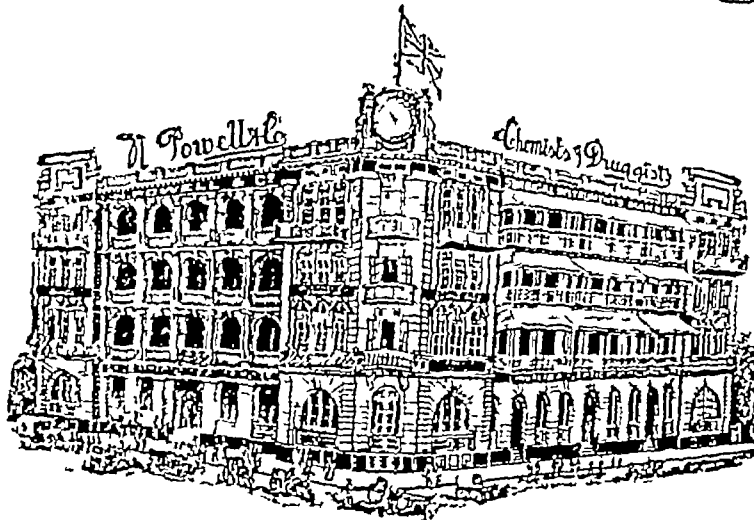




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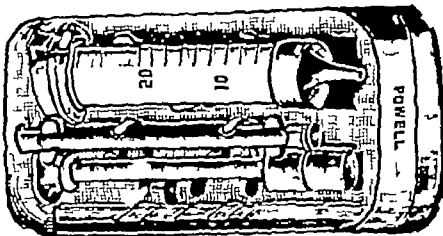


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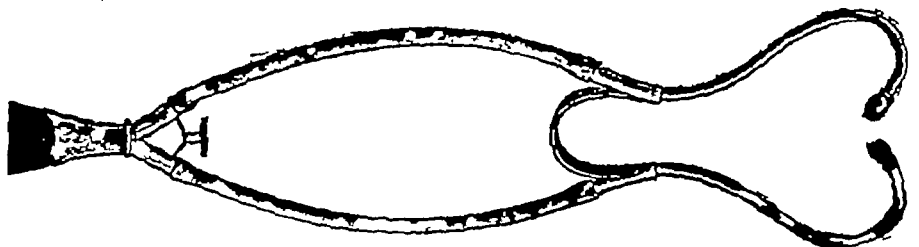
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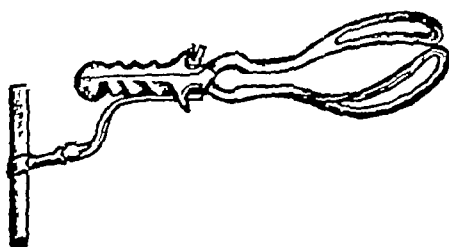
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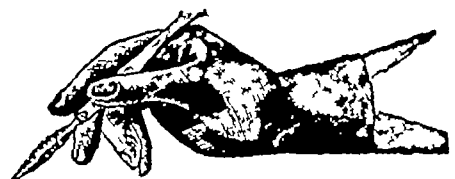


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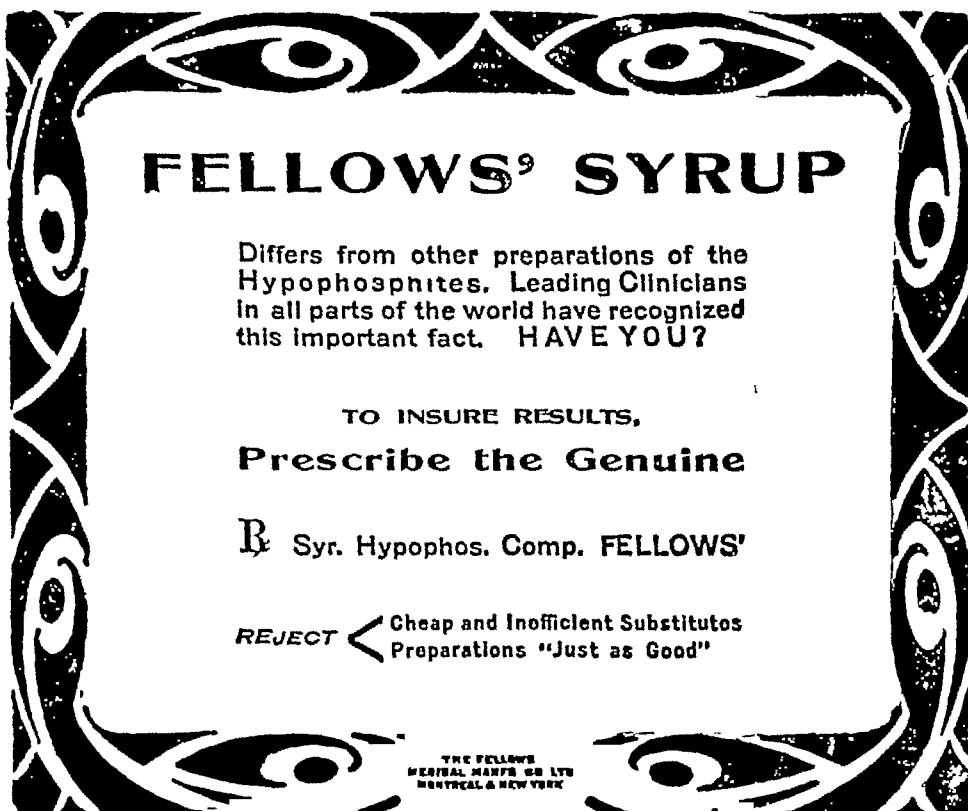
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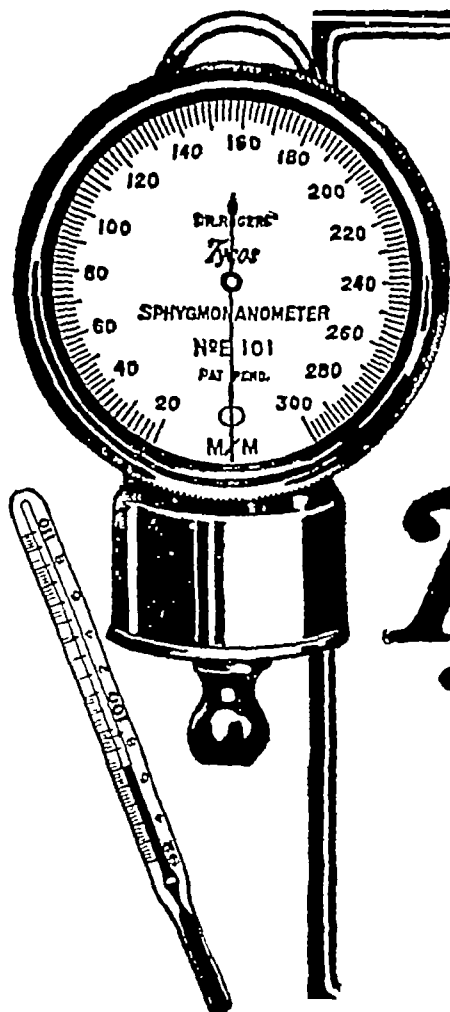
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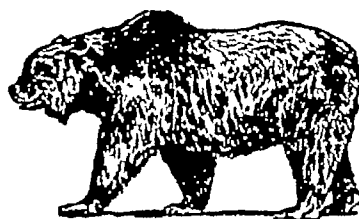


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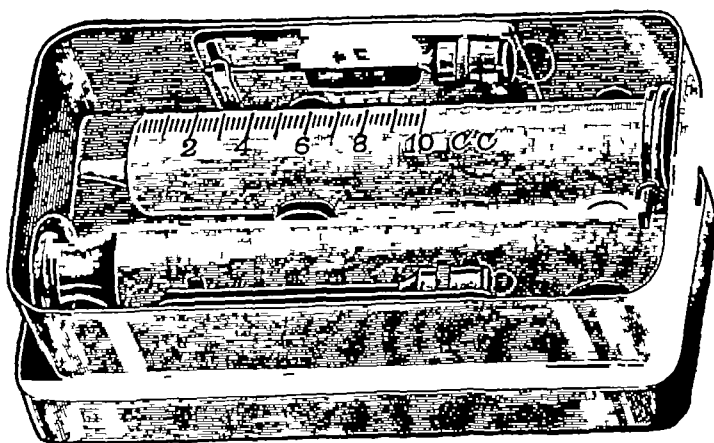


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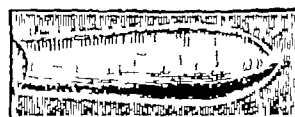
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'Enule' Suppository showing sheath of pure tinfoil



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## Original Articles.

### A PRELIMINARY PAPER ON OBSERVATIONS ON BLACK WATER FEVER (HÆMOGLOBINURIA) IN THE COORG PROVINCE, 1917-1918, ESPECIALLY AS REGARDS ITS ETIOLOGICAL FACTOR NAMELY, A PROTOZOAN PARASITE OF THE GENUS PIROPLASMA IN CONJUNCTION WITH THE MALARIAL PLASMODIUM, OR A NEW AND UNDESCRIBED SPECIES OF LAVERANIA MALARIAE (DONOVAN'S THEORY)

By R. HASELL WRIGHT,

THUR-COLIMS

Civil Surgeon, Coorg, Madras

(Received for publication, 15th August, 1919)

On the 26th July, 1917, I visited a patient at Santicoppa about 9 miles from Mercara in response to an urgent call by the Sub-Assistant Surgeon (the patient's father), and found that the little patient F, aged 11 years, was suffering from a typical attack of black water fever of a severe type, with the following symptoms—marked jaundice, the skin, mucous membranes (even of tongue and mouth) and conjunctivæ were of a bright golden yellow colour and in places of a bronze hue high fever—103.8 degrees F—enlarged and tender spleen and liver, constant vomiting, chiefly yellow or greenish coloured bile, much tenderness in the loins and pains in the legs. Urine of a dark porter colour was being passed in large quantities, but less than at onset, that previously passed during the night and earlier in the day had been kept, and contained about one-third of a reddish brown grumous deposit whilst the upper clear fluid was of a faintly red tinge. Bowels constipated.

*Previous history*—Stationed at Frazerpet for nearly six years. This is a frontier town bordering on the Mysore State, in N. E. Coorg, situated at the foot of the Coorg Hills in the Cauvery Valley, the river winds round the eastern border and the surroundings are very marshy. The locality is highly malarious. The splenic index is noted as 90 to 95 per cent in children. This family consisted of five members and two servants. There was a history of no malarial attacks for five years previous to their coming to Frazerpet. But after six months' residence, all five members suffered from malarial attacks and took quinine, but still continued to get attacks of fever, especially during the malarial seasons, and the three children developed enlarged spleens. After two years' residence, a female servant, aged 15 years, was attacked with severe fever preceded by rigor, and anti-febrin was given at night. On the following morning, she was noted to be markedly jaundiced and in a comatose condition and the clothes saturated with a blood-like fluid (black

water?) There was no menstrual discharge or other vaginal bleeding. The periods had not commenced. This case proved fatal within a few hours. I think this may have been a case of black water fever (hæmoglobinuria). Six months thereafter the Sub-Assistant Surgeon's daughter then aged 8 years, was attacked, she had a rigor and high fever and passed large quantities of portwine-coloured urine, marked jaundice was noted, indeed the case was taken to be one of acute hepatic congestion. Vomiting was a marked symptom with early delirium. Under treatment the urine became clearer after three hours and quite clear after nine hours. The following day, there was a slight return of fever, which is said to have yielded to quinine, the jaundice very quickly subsided and the patient recovered (a mild attack of black water fever). No further attacks of fever for three years, but after about three months' residence in Santicoppa (a small village, 2,500 feet above sea level, marshy, and rice fields in valleys, thickly wooded hills), the girl was attacked with fever on 23rd July, 1917—typical ague. On the 25th July, after the mid-day meal, she passed black urine and soon after had a severe rigor, with high fever. She complained of great weakness, pains in loins and legs and continued to pass large quantities of black urine, vomiting soon set in with delirium and frequent micturition every three or four hours. At midnight the temperature rose to 105 degrees F with great delirium, bowels constipated. The following morning, she was noted to be markedly jaundiced. I visited the case on the afternoon of the 26th as recorded at the commencement of this paper. The symptoms continued, temperature varying from 103 degrees F to 105 degrees F. There were two attacks of collapse when temperature was 99 degrees F. In the latter attack death occurred suddenly (syncope and coma). The treatment had included Harsey's mixture and sterile normal saline. The urine was very characteristic. Microscopically it showed granular, fatty and hyaline casts, and a brownish amorphous deposit. No red cells were noted. The peripheral blood was very watery, difficult to obtain and of a yellowish sanious colour. The parasites shown in the diagrams were seen. This girl slept in a room with fowls or near them, and was bitten severely by fowl fleas (*Echidnophaga gallinarum*), and before the daughter was attacked at Frazerpet, their cattle suffered from an unknown disease, fever and great debility, especially paresis of the hind limbs.

*Brief notes of 2nd Case*—Thelappa, aged 25, a West Coast native (Malayali), working as an estate cooly (rubber and tea) on Hudikeri Estate, about 9 miles from Gonicoppal. This village is very low-lying and skirted by a fair-sized river on the south and western borders of the tea estate and surrounded in places by marshy lands, the locality is notably malarious. He was admitted into the Gonicoppal Local Fund

Hospital, on 13th January, 1918, with a temperature of 102 degrees F. Cerebral malaria was suspected and 10 grains of quinine were injected intra-muscularly. He was comatose, had had bilious vomiting, and was markedly jaundiced. The urine was nearly black. On puncture of finger, watery light-colour blood was obtained with difficulty. Spleen was noted to be enlarged, soft and apparently tender. It extended about 3 inches below the costal arch. The liver was not markedly enlarged. On 1st April the patient was worse generally. The general jaundice was more marked on sclerotics, lips, mouth and nails and body generally. The amount of urine passed was greatly decreased but of the same dark-brown colour, s g 1020, reaction neutral, albumin present, bile nil by Hay's sulphur test and nitric acid. The patient died suddenly on the 15th, never having regained consciousness. No necropsy was permitted. The Sub-Assistant Surgeon, C B Medappa, who is my bacteriological assistant at Mercara and had temporarily been posted at Goniccoppal, sent me two very good slides of the peripheral blood, which showed the parasites depicted in slides 1 and 2 of Goniccoppal case. The history given by the patient's relatives was that he had frequently suffered from fever (nature unknown) at his native place, that he came to Coorg about 14 days previously but never had an attack like the present one, that cattle sheds were in close proximity to the coolly lines on the estate, and that he had often been bitten by leeches, mosquitoes and ticks. This, I think, was a typical case of black water fever.

**4th Case**—Child, female, aged 3 years, attacked with fever on 1st November, 1918. The attack began with a rigor and continued until evening of 2nd, when it subsided with much perspiration, constant bilious vomiting occurred during the attack. On the 3rd  $7\frac{1}{2}$  grains of quinine was given in divided doses (4 powders), on the 4th at the same time (6 p.m.) she had fever, which subsided on the evening of 5th. On the 6th the child passed dark-coloured urine. On the 7th the case came under the observation of the Sub-Assistant Surgeon, Sidapur (South Coorg). Urine passed was of a portwine colour, s g 1016, albuminous, and passed in small quantities. No fever on 8th and 9th, but recurrence on the 10th, temperature 100.4 degrees, pulse 140. Urine light-red, still albuminous but passed in larger quantities. From this date onwards, the urine improved in colour, the fever subsided, and by the 15th November the child was convalescent (probably a case of malarial hæmoglobinuria), slides sent me of this case, improperly taken, only showed a few malarial rings, increased platelets and large lymphocytes.

**5th Case**—Motor agent, had a severe rigor, temperature 104 degrees F, with enlarged and tender liver and spleen. Jaundice and passage of black urine, coma. The specimens of

peripheral blood sent me showed only indications of a recent malarial infection. Urine s g 1010, reaction faintly acid, colour dark portwine, albumin present in large quantity. When boiled with liquor potassæ, it is said to have given a red precipitate. Temperature was normal on 25th and 26th, and the urine began to clear but still contained some albumin. The history obtainable was that he had suffered from fever for a fortnight in the early part of January. At this time he had an abscess in one leg. He was attacked again on 23rd January, 1918, with fever preceded by a severe rigor and passed dark-coloured urine. On the 30th he had another ague-like attack. Liver and spleen were found to be enlarged and tender and much pain was complained of in the loins and legs. He passed dark-coloured albuminous urine, and was slightly jaundiced. On the 1st February, 1918, evening, had a recurrence of fever, temperature 104 degrees F with coma, and was removed by his relatives to his house in a dying condition. This evidently was a case of hæmoglobinuric fever. Of what kind?

**6th Case**—Child, aged 12 years, with a history of malarial attacks, had a severe attack of fever in which he was noted to have passed very dark-coloured urine, but recovered under quinine treatment. The cause was not diagnosed, but attributed to severe malaria. The patient recovered but remained for a long time weak and anæmic.

**7th and 8th**—These cases were reported from Napoklu, a village in S W Coorg. They were boys, aged 7 and 11, who passed dark-coloured urine during fever said to be of malarial type. Both had enlarged spleens and the liver was enlarged in second case with slight jaundice. No blood specimens, etc., were sent to me.

At the time when the first case occurred at Santicoppa, July, 1917, the headman of that village stated that he knew of a Brahmin boy who had died from a similar disease a few months previously, namely, high fever with dark-coloured urine. He said that such cases had occurred in the valleys near Santicoppa, that there was no cure for the disease, which was known as "devil's stroke," "devil's disease," and that all attacked died. This information was given quite spontaneously, and we have a vague history of a patient (from Goniccoppal) being admitted into the Civil Hospital, Mercara, in 1909, with symptoms of hæmoglobinuric fever which ended fatally. This case was diagnosed as dengue. It will thus be seen that black water fever is not altogether unknown in the Coorg Province.

A brief review of the latest theories as to the etiology of hæmoglobinuria—

The passage of more or less altered hæmoglobin in the urine has been divided etiologically into the toxic and paroxysmal. Hæmoglobinuria of malarial origin has been classed under the second head.

## SLIDE I

### PAGE 1

1, 3 41 53—Horse shoe shaped parasites 1, free 3 in very small erythrocyte 41, in a poikilocyte 2, 17, 18, 26, 31 32 50, 60, 64 65 71, 79 87—Oval shape, with central chromatin or subcentral or eccentrically placed 2, misshapen red cell with two small parasites below red cell with single parasite 17, pear shape 28, one parasite central chromatin, one parasite double 71, two parasites central chromatin 79, two parasites central chromatin and one ring, the red cell is breaking up and the ring parasite is almost extruded 4, a peculiar large parasite shewing single central chromatin and vacuole 5, 31, 35, 42, 46, 47, 49, 52 56, 59, 63, 67, 72, 79 —Ring forms 34 and 49, thick and heavy chromatin peripheral 63 peculiar chromatin peripheral bar also 66, 67, one ring and one bottle shape 72 ring form 79, one ring almost outside red cell 6, 7, 11, 29, 33 36, 38, 70, 68, 84 86—Long amoeboid processes stretching nearly across the red cell 33 very fine cytoplasmic process also 36, the latter resembling bacillary form of *Piroplasma* (*Theileria*) *Parva* found in blood of cattle (Christophers) in Madras 38, oval shape with fine extension 68 resembles 38 84, extra corpuscular 86 intra corpuscular coccoid bodies

## SLIDE II

8, 9 10, 12 14 15, 16, 52, 53, 67, 75, 81, 83—Phial or bottle shape much resembling those observed in 1st case of B W F, North Coorg 12, three bottle shape parasites in red cell, also 15 16, two phial shape parasites in a large mononuclear leucocyte 52, in misshapen red cell 53 in poikilocyte 67, one swollen, one typical 75, one bottle shape small and one large pear shape with two chromatin dots 88, single erythrocyte showing polychromasia. 13, very small ring and oval parasite, three chromatin dots 14, one phial shape and one elongated parasite 17, 18, 26, 31 32, 55, 60, 64, 65, 71 73, 79, 87—single central or eccentrically placed chromatin 19, 21, 27, 39, 40, 43 Dividing parasites, sporulating malaria. 22, 22, 44, 45, 61, 73 74 75—Oval or pear shape with two chromatin masses 83 with free chromatin 25, elongated parasite with two chromatin masses much resembling *Piroplasma* (*Babesia*) *Canis* (Christophers) 48, coccoid parasites with joined chromatin, 50 coccoid parasite in distorted red cell, Polychromasia 51, two parasites central chromatin 77, polychromatic red cell, also 69, 76 and 77 and 89, 82, 78 parasites being extended from red cell which is breaking up 85, chromatin masses in large mononuclea Many of the red cells are peculiarly distorted

V=Vacuole P= Pigment.

E H W



Nos. 1, 4, 10, 19, 24, 38, 40—Piroplasma forms

2, 7, 20, 32, 49, 51, 62, 73, 74, 93—Oval parasites, two chromatin dots, one, the larger, situated at the blunt end

3, 9 (very small ring and bacillary form), 13, 16, 34, 37 (one ring and bacillary form), 45 (with central chromatin), 54 (same as 45), 64, 70 (one bottle shape, one ring, two chromatin dots), 79 (broad bar chromatin) 83, 85, 92, one triangular and one central chromatin parasite, 99 (a very minute ring), 100, a small piroplasma form central chromatin, 103, a peculiar double parasite

Ring forms

5, 8 14 (triangular parasites either lying on or being extruded from erythrocyte), 18, 23 44, 48 (one horse shoe shape, one coccoid body), 50, 52, 64, 65, 72 (one horse shoe shape, one coccoid), 87 (one triangular, one peculiar bacillary or coccoid parasite), 92 (one triangular, one central chromatin ring)

Horse shoe and triangular shaped parasite forms 6 probably one horse shoe, overlapping a bacillary form 7, 20 49, 51, 73, 93 (characteristic oval forms with two marked chromatin dots, the larger situated at the blunter end) This form is seen in all the pages of diagrams, closely resembles those observed in case I, Santicoppa, North Coorg, as also those forms noted by Colonel Donovan in the case of B. W F from "Gumsur Mallahs" 11, a peculiar form, probably ring and bacillary form

41, 12, 78, 86, 95 and 101, probably degenerating erythrocyte, or anaplasma form, 15, 17, 22, 25, 31 (one ring, one bacillary form), 39, 42, 46, 47, 48, 53, 55, 57, 67, 69, 71, 72, 76, 77, 81, 81, 82, 84, 87, 89, 90, 98, 102, bacillary or coccoid forms, resembling forms of Theileria, 27, large mononuclear with chromatin particles probably phagocytosis, 29 peculiar form, 28, 33, 59 (two phial or bottle shape parasites side by side, 63 the same), 70, 97, phial or bottle shape

#### BLACK WATER FEVER

Col Hasell Wright, I M S very kindly sent me two slides of black water fever under his observation in Coorg. No 1 slide I found impossible to restrain satisfactorily, notwithstanding orange-tannin monosodium phosphate and boric solutions, so I cannot express an opinion on the parasites in that slide. No 2 slide, however, restrained fairly well and I was able to detect the parasites resembling piroplasma. The parasite in No 2 slide is a very small *Laverania*, the chromatin much smaller than in *L. malarie*. In some R. B. O's the organisms simulate piroplasma closely, as can be noted in the figures I have given in the plate I have taken but there is no doubt that the full grown forms and the sporulating bodies contain well marked pigment, thus excluding the presence of piroplasma or the organism as giving rise to black water. Unfortunately my knowledge of black water has been after the R. B. O infected has been destroyed. In one case from Gumsur Malliahs, Ganjam District, I noted forms like Col Hasell Wright's. I hope Col Hasell Wright will carry out further work on these peculiar and what I consider an undescribed species of *Laverania*. I believe in several species of *Laverania* (not including the genus *Plasmodium* with the species *malarie* and *vivax*).

C DONOVAN



Experimentally, by intravenous injections in animals hæmoglobinuria can be caused by dissolved hæmoglobin or by substances that will dissolve the red corpuscles, as water glycerine, salts of the bile acids inhalations of ether, sulphurated hydrogen, etc.

In man toxic hæmoglobinuria may be caused by poisons such as sulphuric acid, hydrochloric acid arsenic chloride of potassium, naphthol, etc. Also it may be caused by extensive burns sun-stroke and is symptomatic in specific diseases (scarlatina enteric, etc.) It occurs in icterus of the new born and may be caused by dissolution of the blood in purpura, scurvy, typhus, variola hæmorrhagica, etc.

Intermittent or paroxysmal hæmoglobinuria is a special specific disease almost identical with black water fever (tropical hæmoglobinuria) in onset symptoms and pathology, in fact if a case of the former occurred in the endemic regions of black water fever it certainly would be diagnosed as the latter disease. By some authorities black water fever is described as paroxysmal hæmoglobinuria of malarial origin. This disease (P. H.) is said to be due to syphilis (*S. pallida*) and the immediate provocative cause is attributed to cold either severe chilling of the skin generally, or mere exposure of hands and face to cold or damp winds or wetting of the feet in cold water. Experimentally hæmoglobinuria has been produced in a patient by dipping the feet in ice cold water (Neilson and Ferry, *Arch. of Int. Med.*, June 1910). Ehrlich showed that by placing a ligature around the finger of a patient and exposing it to cold, the blood corpuscles were broken up and the hæmoglobin dissolved in the serum. It may also be caused in such patients by over-exertion and mental excitement. Cooke writes—As result of chemical observation, the Wassermann reaction, the luetin test and serological studies in metasymphilitic disease it seems safe to say that "Syphilis is the most important, possibly the only etiological factor in paroxysmal hæmoglobinuria" (*Am Jour Med Sci.*, August 1912). W. W. Young (*Jour Am Med Assoc.*, January 31 1914) writes—Case of P. H., in the blood serum of which, either constantly or brought into existence by cold, there exists a substance which hemolizes the red blood cells this gives rise to hæmoglobinemia, which in turn provokes the phenomena of a paroxysm much like that provoked by the destruction of hematin by the action of the malarial parasite. The excretion of the hæmoglobin in the urine by the kidneys is one of the most striking phenomena and gives the disease its name. This auto-hemolytic substance in the blood is in all probability the result of infection by the *Spirochaeta pallida*, on the other hand the possibility exists that the substance which is produced by the organism in syphilis and to which the name of anti-body is given (which produces fixation of complement, thus giving a positive Wassermann) is produced by some other

agency in this disease. Thus there may exist a positive Wassermann without syphilis. The existence of this same substance which gives rise to hæmolysis in para-symphilitics so-called makes it highly probable that the etiological factor here too is syphilis. It is quite possible that hæmolysis may take place in the menstruum of the para-symphilitic and that it is an increased permeability in the hæmoglobinuric which gives rise to actual hæmoglobinuria. The cause of black water fever has by some been attributed to syphilis, alcoholism, poisons, etc., and the attack is precipitated by cold, over-exertion, physical and mental or in those greatly run down in general health.

The pathology of the two diseases (P. H. and B. W. F.) under comparison differs only as to the parasite or parasites which produce the powerful hæmolytic toxin producing the hæmoglobinuria-urine, whose colour varies from a delicate rose colour to a reddish or brownish black or deep black and has been likened to the colour of portwine, coffee or porter, it is of variable sp. gravity and highly albuminous depositing after a time a chocolate-coloured grumous substance which under the microscope is seen to consist of granular hæmoglobin-renal casts occasionally, a few (very few) red cells distorted and breaking down also a few crystals of uric acid, and oxalate of lime. The colouring matter is most frequently meta-hæmoglobin. Bile pigments are seldom present, the albumin present is in the form of serum albumin, serum globulin and nucleo-albumin. The reaction is generally faintly alkaline. Phosphates are reduced. Yorke (*Annals of Trop. Med. and Parasitology*, December 30 1911) believes that the epithelium of the convoluted tubules of the kidney is responsible for the excretion of the hæmoglobin and possibly also that of the tubules of Henle, for in sections of kidneys removed within a few hours of the intravenous injection of hæmoglobin, the casts are found limited to the cortex and are not seen in the larger collecting tubes of Bellini. Later, the plugs are found in the large collecting tubes, having been probably washed down from higher portions of the tubules. Probably hæmoglobin is excreted by the renal epithelium rather than filtered through the glomeruli, and that the amount eliminated is dependent on the activity of the epithelium lining the tubules. The lesions that appear in the kidney are purely degenerative and not inflammatory.

**Blood**—The pathology is very similar in both types of the disease. The peripheral blood is noted to be thin, watery and pale red in colour, often of an oily nature and obtained with some difficulty. Recent investigations tend to demonstrate the presence of a potential hæmolytic toxin (hæmolysin) composed of an amboceptor and complement. The complement is a normal constituent of blood serum whilst the amboceptor is the specific hæmolysin. The combined

action of this dual toxin on the red cells is dependent upon certain conditions, one of which is a variation of the temperature of the blood. Exposure to cold favours the union of the amboceptor to the red cells, these when carried to the internal parts of the body, where the temperature of the blood is higher, are acted upon by the complement and hæmolysis takes place, first producing hæmoglobinemia and then hæmoglobinuria. It is essential that the blood be first chilled and then subsequently warmed to produce hæmolysis. During the attack the number of the blood corpuscles is diminished, but afterwards many small red cells and hæmatoblasts appear, and the number of the red corpuscles rapidly becomes normal. It has been shown that the blood serum of patients suffering from P H contains during the attack a substance which unites with the red blood cells at low temperatures and on subsequent heating at 37 degrees C in contact with normal serum causes their hæmolysis. Widal and Rostaine have offered an explanation of the phenomenon. They think that the normal serum contains an anti-hæmolysin, which in cases of P H is diminished in amount, and therefore allows auto- or iso- hæmolysis to take place. The writers conclude that their original supposition was correct since three of five of their cases of P H gave a history of syphilis, the authors suggest that this toxic autolytic substance may in some way be produced by a syphilitic infection—Donath and Landsteiner (*C B Bakt u Parasit*, 1907-45-255). In P H the leucocytes are usually about normal, the alkalinity decreases slightly, red cells decidedly, but their number rapidly increases to normal or above it from three to six days after the attack. In B W F during the attack there is leucocytosis (polymorphonuclear and large mononuclear) and after the attack a leukopenia with mononuclear increase. By some observers Raynaud's disease is considered to be closely related to P H and in some cases the two diseases are combined. The former is more commonly seen in women, and the latter in men. The tropical hæmoglobinurias have been divided into three distinct types.

1 *Malarial*—A hæmoglobinuria occurring during the course of pernicious malaria and caused by *Laverania malarie* together with some other factor which *inhibits* the production of anti-hæmolysins. Blasí, Bren and Zieler have shown that the malarial parasites give rise to a hæmolysin which probably varies in quantity and quality with different strains of parasites, but is kept in check by the action of anti-hæmolysin which is formed in the body, but in certain circumstances, such as exposure to cold, etc., may fail to be produced in sufficient quantities and hæmoglobinemia with hæmoglobinuria may occur. Zieler and Brom have also demonstrated the presence of anti-hæmolysin in the serum of normal individuals as well as in that of persons suffering from pernicious malaria. It would, therefore, appear as

though the presence or absence of hæmoglobinuria in an attack of pernicious malaria depends upon the relationship between the quantity of hæmolysin produced and the amount of anti-hæmolysin produced. The symptoms of this variety are those of an attack of pernicious malaria in which the main feature is that of hæmoglobinuria, the presence of *Laverania malarie* in the blood, and the rarity of jaundice of a marked nature as is seen in the specific disease (B W F).

2nd Type—*Quinine hæmoglobinuria*, caused by the administration of any of the ordinary salts of quinine in certain cases of chronic malaria or malarial cachexia. Sir Patrick Manson has pointed out that "the idea that quinine might produce B W F originated from a misinterpretation of the fact that the administration of quinine even in small doses may provoke the manifestation of black water fever in a patient in whom the infection is latent." Again, he states that B W F was known long before cinchona bark was introduced into Europe, having been described in the days of Hippocrates, and that cases have been reported amongst Europeans who had never taken quinine. Cadamatis mentions 32 such cases. On the other hand Ketchen has recorded a case of seven consecutive attacks in the same individual in whom each attack followed a dose of quinine, and Castellani and Chalmers have recorded similar cases of hæmoglobinuria due to quinine, and record six attacks in a year. These authorities say that the administration of the quinine salts in such cases is not the sole cause, otherwise the condition would be more commonly met with than at present. Therefore, it is quite safe to give quinine to the majority of cases of chronic malaria without fear of causing hæmoglobinuria, for the administration of a salt of calcium prior to the quinine will prevent the hæmoglobinuria which may have occurred after quinine previously given. Barralt and Yorke have demonstrated the action of quinine bi-hydrochloride, also hydrochloric acid and sodium hydrate upon healthy red blood cells.

(1) All the above-mentioned agents produced hæmolysis. (2) In equimolecular concentration their hæmolytic power is almost the same. (3) The hæmolysis produced by quinine resembled a catalytic action and took place at a monomolecular rate. (4) During life it is not possible to reach a percentage of quinine in the blood sufficient to cause hæmolysis owing to the toxicity of the drug. Some observers believe that quinine produces the hæmolysis by lowering the osmotic pressure of the blood plasma. The symptoms of this type are those of an attack of black water fever, but of a milder nature, and jaundice is absent.

3rd Type *Black water fever*—A specific disease. This disease was not described before 1885 in India, and Manson explains that probably this was due to its recent introduction into India, which is supported by the fact that many

medical men in Africa assert that B W F is of comparatively recent introduction there, and is becoming yearly more common. This applies also to India and other tropical and sub-tropical regions. Meek says B W F first appeared in Texas in 1886 or the disease was formerly confounded with bilious remittent fever.

*The malarial theory*—The older writers attributed this disease to a severe manifestation of pernicious malaria. Then it was attributed to the sub-tertian parasite and recently the *P. vivax* and *P. malariae* have been noted in some of the cases. The theory was based on the fact that B W F only occurred in localities where severe malaria also existed and that those who had an attack of B W F had always previously suffered from malaria and had generally had frequent attacks. Stephens and Christophers state that the blood of persons examined on the day preceding the hæmoglobinuria contained malarial parasites in 95.6 per cent, during the day of attack 61.9 per cent and the day after the attack only 17.1 per cent. They further point out that though they only found malarial parasites in 12.5 per cent of all their cases still they found evidence of malarial infection such as pigmented leucocytes or an increase in the percentage of large mononuclears in no less than 93.8 per cent. Against the theory that malaria is solely the cause of B W F Manson writes that though in many regions B W F is co-endemic with one or other form of malarial fever, it is not so in all regions. It has its own peculiar distribution and is absent or very rare in many places in which the various intermittent fevers are very rife. Again it has many times been recorded as occurring in persons who have never suffered from malaria, and, according to Craig, it has occurred in people who have not only never been known to suffer from malaria but in whom neither before, during, nor after an attack have parasites been found and post-mortem has revealed negative evidence for malaria. As B W F and malaria are co-endemic, it is not surprising to find malarial parasites in black water fever cases and more often the sub-tertian as that parasite is the more prevalent in the localities where black water fever is endemic. Yet of all intermittent fevers the sub-tertian is that which clinically differs most from black water fever. It is true that sub-tertian varies considerably in different cases, but the type of the disease does not alter and the number and distribution of the parasites is always in accordance with the intensity and nature of the various symptoms. In no case of sub-tertian, not even the most pernicious, do we ever find the symptoms peculiar to B W F. On the other hand, all cases of black water fever, however grave or mild, always exhibit the same characteristic symptoms with no difference other than as regards intensity and duration. The existence of the large mononuclear leucocytosis present in B W F does

not conclusively point to its malarial origin, for a similar form of leucocytosis occurs in several forms of protozoal disease. Nowadays there are very few adherents to the theory that malaria alone is the causative factor in B W F. Donovan, if I understand correctly, believes in several species of Laverania, or postulates a special undescribed variety of Laverania with the known forms, as the cause of black water fever. If it be admitted that there is a malarial variety of hæmoglobinuria, and that the malarial parasites (especially the sub-tertian) do produce a hæmolytic toxin (hæmolysin) which in certain circumstances is not kept in check by the anti-hæmolysin which is formed in the body, as shown by Blasi, Bren and Zeiler, the theory becomes an attractive one—especially if it be argued that the new species of Laverania has a more powerful hæmolytic property. If this special Laverania is combined with one or other of the known varieties of Laverania, their combined hæmolysins may be responsible for the explosion of the symptoms of black water fever. Or the presence of the new species with powerful hæmolytic properties and fresh infection with *Plasmodium vivax* or *P. malariae*, which are more frequently seen in India, may be sufficient to determine an attack. Or the supervention of a second disease or debility caused by dysentery, over-exertion, exposure to cold, etc., in those whose blood contains this special species of Laverania, may cause an attack of the disease. Cook has placed on record five causes of black water fever in which an attack of spirillum fever appeared to be the provocative agent. The parasites in my first two cases are very similar to Donovan's B W F forms and the pigmented forms in case 2 indicate a malarial infection. Could therefore the piroplasma forms and the unpigmented forms be a new species of the malarial plasmodium (Laverania), in conjunction with one or other of the known forms (*L. praecox*, *L. immaculata*), or even the *P. vivax* or *P. malariae* (pigmented forms) be the cause of black water fever in at least case No. 2? Or is the new and peculiar species one of the known species that has acquired a peculiar contour resembling the piroplasms and a powerful hæmolytic toxin by passage through some unknown mammalian or insect host? Having noted a malarial plasmodium whilst dissecting a land leech (*Haemadipsa zeylanica*), in whose gut the parasite appeared to me to be developing, I started an experiment by feeding leeches on cases of malaria also ticks (*Hyalomma aegypticum* and *Margaropus annulatus*) with a view to ascertaining if any development did take place, but my investigations were stopped by the advent of the great pandemic wave of influenza, and I could not arrive at any definite conclusions in this respect. Stephens recently has supported the malaria plus some other factor theory—the second factor being quinine. According to him, B W F is not a disease per

se, but rather a condition of the blood in which quinine, other drugs, cold or even exertion may produce a sudden destruction of red cells. The condition is produced only by malaria and generally by repeated slight attacks insufficiently combated by quinine. In such cases of chronic malaria, *ie*, in those suffering from anæmia with repeated attacks of fever and repeated doses of quinine, B W F sooner or later almost certainly supervenes, at least in tropical climates. On Stephens' theory Castellani and Chalmers observe "These statements, if genuine B W F is meant, are too sweeping, otherwise the home of the disease would be Ceylon, where it is so rare that we have never heard of a genuine non-imported case for in this island there are Europeans and natives with just the conditions required by Stephens and yet they do not develop B W F, because the only two cases which we have met with or heard of in Ceylon in ten years were most probably cases of quinine hæmoglobinuria. On the other hand Stephens' remarks are correct if applied to quinine hæmoglobinuria." According to McCay, the action of quinine in causing hæmoglobinuria is explained by the sulphates causing a decrease in the total inorganic salts of the plasma, which he thinks implies a decrease in its osmotic tension, water therefore passes into the red cells, causing them to swell up, and, if the decrease in osmotic tension of the plasma is sufficient, they burst. He considers that the causation of B W F is three-fold—(1) Injury to the stroma of the red cell by the malarial parasite. (2) The action of the malarial hæmolysin. (3) The administration of sulphates. He thinks that though the first and second causes may bring about the disease, still quinine sulphate or any other sulphate by its action on the plasma is the exciting cause. On the other hand he finds that chlorides cause an increase of the resisting power of the erythrocytes to hæmolysis. Quinine hydrochloride, especially when combined with sodium chloride and dilute hydrochloric acid, causes usually a marked rise in the resistance. Therefore he considers that it is not the quinine but the sulphuric acid in the form of quinine sulphate which produces the hæmolytic action. In addition to sulphates, McCay found that alkaline carbonates, compounds of alkalis with vegetable acids and also potassium salts diminish the inorganic molecules of the plasma, thus tending to help hæmolysis. Castellani and Chalmers, however, state that they have seen hæmoglobinuria follow the administration of euquinine—the hydrochloride and the tannate. In 1893, Sir Patrick Manson promulgated the theory, that on account of its peculiar symptoms and geographical distribution he considered black water fever to be a disease *suu generis*. In 1898, Sambon, on account of its resemblance to the hæmoglobinuric fevers in animals, brought forward the theory that human black water fever would probably be found to

be a babesiasis. This view has been adopted by Blanchard and others. A body resembling a *babesia* has been described by Forau, but has been criticized by Stephens as resembling the fragmentation and flagellation of erythrocytes, commonly seen in malarial anæmia in the tropics. The analogies between the hæmoglobinuric fever of man and the hæmoglobinuric fevers of cattle are most striking, but as yet no *babesia* has been found in cases of black water fever. Manson suggests that (1) the amœboid forms of the parasite may have been mistaken for the early forms of the sub-tertian parasite, or (2) the parasite has escaped observation on account of diminutive size or anatomical habitat, or (3) it is not usually found in the peripheral blood. Leishman has recently described certain minute bodies in large mononuclear cells of endothelial origin in the blood of a number of cases of black water fever. He also describes peculiar cells which he calls "Chrome cells," in the blood of such cases, and considers that these bodies which are either structureless homogeneous, circular or ring forms, may possibly be Chlamydozoa.

Balfour suggests that the disease is not of parasitic origin but due to the injection of some powerful hæmolysin introduced by the bite of some unknown insect or arachnid. Castellani and Chalmers consider that the cause of the disease is some as yet unknown protozoal parasite.

Ever since Manson promulgated the theory that B W F was a special specific disease in 1893 and Sambon suggested, because of its striking analogy to the hæmoglobinuric fevers of cattle, horses, sheep and dogs, that B W F might be a form of babesiasis this view has been adopted by many of the highest authorities. Some have now rejected it but the very close resemblance between the diseases in man and animals is very striking. In locality, type and mortality, the similarity of the symptoms and post-mortem appearances we have powerful arguments in favour of the theory. In the relapsing fevers of the three continents the symptoms are the same and it is only necessary to describe one variety, *eg*, the European; the difference in the other varieties being easily traced to the different species of the spirochætes which causes them or the insect vector that conveys them. The same remarks apply to the spotted fever of the Rocky Mountains, of which one variety occurs in the valley of the Snake River in Idaho, and is spread by the tick *Dermacentor modestus* and the Montana disease which occurs in the Bitter Root Valley and is spread by the *D. venustus* (*Andersoni*). The former has a mortality of 5 per cent and the latter of about 90 per cent. Ricketts considers that the difference between the two forms of fevers depends on the difference in the species of piroplasm or the tick that conveys it. The history of the discovery of this piroplasm is interesting. In 1899, Maxy

wrote a paper on the disease. In 1902, Gwin and McCallough read papers on the same and Wilson and Chowning were deputed to investigate the disease in the Bitter Root Valley. They concluded that it was due to a *babesia*, parasitic in a squirrel (*Citellus columbianus*) and the wood-chuck (*Marmota flaviventris*), and that it was spread by the tick *D. variolatus*. In 1903 Anderson investigated the disease, and supported Wilson and Chowning as regards both the parasite and the tick. In 1905, Stokes published his report in which he failed to find evidence of the existence of the parasite in man or squirrel or of the transmission by the tick. In 1906 King found distinct experimental evidence of the transmission of the disease by the tick. Ricketts has proved that the *D. andersoni* spreads the disease a conclusion which he supported by experiments on guinea-pigs and monkeys but the credit of this discovery he stated should be given to McCall and Brereton. In 1908 Ashburn and Craig accepted the transmission by the tick. The etiology of spotted fever (in Sajou's Cyclopadia, Vol. 8, 1917) is given as follows—Caused by a protozoan parasite which is transmitted to man through the bite of the wood tick (*D. andersoni*). To Wilson and Chowning belongs the credit of discovering this parasite, three forms of which have been identified by John F. Anderson. The most common is a single ovoid body, refractile, situated within the red cell usually near its edge and *closely resembling the earliest intra-corpuscular parasites of aestivo-autumnal malaria*. When the blood upon the freshly prepared slide is warmed, the parasite rapidly projects pseudopodia and may change its position slightly. A second form, somewhat rarer, is larger and larger at one end and showing there a dark granular spot; this form also is ameboid. The third form, arranged in pairs, is pyriform in shape, with the smaller ends approaching each other and in some cases united by a fine thread. The parasite is developed in the female tick and the young ticks, after being hatched, transmit the infection. The female gets her infection by biting one convalescent from spotted fever. Malignant jaundice of dogs is due to *Babesia canis* carried by the tick, *Ixodes ricinus* (ricinus), *Haemophysalis leachi* and similarly Texas fever or red water of cattle is due to the *Babesia bigemina*, carried by the tick *Margaropus annulatus*, etc. Similarly Isutsugamushi disease (Japanese river fever) occurs in river valleys in certain districts in Japan, after flooding of the adjacent land which some weeks subsequently gives rise to the appearance of a red mite (the larval acarus of *Trombidium akamushi*) that bites all those entering these parts and gives rise to the disease. The etiology of this disease, though not actually known, in theory is as follows—(1) Bacterial *A. proteus* (Bal and Takana) associated with staphylococci and streptococci in the lungs,

sputum and urinary sediment. (2) The protozoal theory. Ogata considers that the cause of the disease is a plasmodium which he states he has found in the blood of numerous patients. (3) Chemical theory. Takana believes that the true cause is a toxin contained in the body of the mite and introduced by its bite, but against this latter theory is the fact that Akamushi of other regions do not convey the disease. These three theories have in a similar manner been brought forward to explain the possible etiology of B. W. F. From a very brief review of the etiological factor in the above mentioned diseases it is seen that numerous theories have, from time to time been brought forward to explain the cause. Later they have been disproved, adversely criticized, or the explanation of the earlier observers has been accepted. The discovery of the piroplasm of Rocky Mountain spotted fever is, I think, especially interesting, more especially the resemblance of this parasite to the earlier forms of the plasmodium aestivo-autumnal fever. Earlier in this paper I have discussed the possibility of the parasites of my two cases and of Donovan's black water fever forms as being possibly a new species of *Laverania* which, in conjunction with the known species is a causative factor in B. W. F. (Donovan's theory) or the conjunction of the presence of this new species with *Plasmodium vivax* or *P. malariae*, but it appears to me to be strange that the admitted regularities of contour, development, etc., of the known varieties of the malarial plasmodium should in this new species assume the almost typical form or forms of the *babesiaceae*, and resemble those types of the piroplasms which are the cause of the hæmoglobinuric fevers of animals. Moreover, I ascertained that Texas fever was very prevalent amongst cattle in the province during the year 1917-18. I have also been told that Texas fever is very prevalent on the Western Coast (Malabar) in some years. I therefore assumed that possibly the parasite noted in the second case was a species of piroplasm. The diagrams show unmistakable presence of the malarial plasmodium, and I formed the conclusion that the second case was possibly due to an infection by *babesia* along with the malarial plasmodium. It is difficult to judge which was the primary infection for the latency of both species of parasites (piroplasms and malaria) is well known. As regards the former parasites, it has been observed that cattle that have been attacked with Texas fever, and rendered immune, still harbour in their blood, in small numbers, the parasites which in any subsequent intercurrent disease may determine an attack of red water fever. Edington has observed this to occur when cattle from the South African endemic area of Texas fever were inoculated against rinderpest. With reference to the latency of the malarial plasmodium, I had a good example recently. An officer of the Coorg Commission was attacked with a severe



infection of simple tertian fever at the end of January 1919. He underwent a full curative course of quinine, and blood smears at the end of the course were negative. In June, after touring in the interior of the province, he contracted a septic sore throat which ended in a right-sided peritonsillar abscess. During this illness I prescribed a 5-grain dose of quinine daily in consideration of the recent attack, though I was unable to detect any parasites in the peripheral blood. During convalescence the patient developed clinically a typical simple tertian fever. On the first day of this attack I was unable to find any parasites after careful search, but on the second attack the peripheral blood showed a few typical rings and a few larger forms. He was placed on full doses of quinine and made a rapid recovery. The parasites were probably developing in the internal organs. I therefore argued that the peculiar-shaped parasites (piroplasm? or new species of *Laverania*?) were the original infection, whilst the typical pigmented and sporulating malarial infection was the secondary, or more recent, for there were no gametocytes to be seen in the slides. As to the type of the plasmodium seen in case No 2, at first I was of opinion that it was *P. malariae*, from the regular appearance of the merozoites in the sporulating forms and the absence of enlargement of the red cells and because the sporulating forms of *Laverania* are rarely to be seen in the peripheral circulation. During recent years many different types of the piroplasmidæ have been recorded and by some authors placed under sub-genera, as *Theileria*, *Nuttalia*, *Anaplasma*, etc. The discovery of the piroplasm of Rocky Mountain fever, referred to earlier, would in my opinion tend to strengthen my argument that the black water forms seen in my two cases and those of Colonel Donovan may possibly prove to be true piroplasmata, and that the fresh infection with the malarial plasmodium was the determining cause of the explosion of the symptoms of black water fever. Especially interesting is the recent discovery of a new type of piroplasm by Dr J W S Macfie, Pathologist at Accra, in 1916. The infected cow in whose blood the parasites existed died and Dr Macfie observed that in his experience infections of cattle with piroplasms that he had seen in West Africa had been benign. Dr Carlos Franca, the well-known authority on this group of parasites, after examination of Dr Macfie's specimens reported that he identified *Proplasma bigemina* resembling *T. mutans*, and a third parasite of great scientific interest, having characters intermediate between those of plasmodium and piroplasma and recalling those of the genus *Achromaticus*. In all probability it was to this third parasite that the death of the animal was due. Dr Carlos Franca described the forms of this new parasite as follows—

1 Round forms, with a regular outline and having a round central nucleus.

2 Fusiform or filiform parasites with a rounded central nucleus

3 Triangular forms with a large round nucleus at the summit

4 Red shaped forms very long and thin, occupying the whole diameter of the red corpuscles and having a central nucleus

5 Amœboid forms, with numerous digitations similar to those of *plasmodia*. Parasites belonging to the piroplasmidæ are the cause of serious diseases in many parts of the world, but in West Africa, the two species most commonly found, namely, *Proplasma (babesia) bigemina* and *Theileria mutans*, appear generally to be benign. The discovery of this new species points to a highly virulent and fatal infection. The West Coast of Africa is well known to be an endemic region of black water fever. The destructive effect of the hæmolysis in black water fever would appear to have an equal effect on the parasites and on the red cells, as is seen from the diminishing number of parasites seen on the second and third day of the disease, and onwards, the small number seen in case 1, blood taken on third or fourth day compared with the large number seen in case 2, taken on the first or second day of the disease.

#### CONCLUSIONS

(a) That black water fever is probably endemic in the province of Coorg, that it is more prevalent in some years than others, possibly coincident with the prevalence of hæmoglobinuric fevers of animals. That the localities where this disease occurs is in the valleys of rivers, or valleys with marsh lands at the foot of the hills.

(b) That the parasites observed may possibly prove to be a piroplasm in conjunction with the malarial plasmodium, or a special species of *Laverania* in conjunction with the known varieties of the malarial plasmodium or *Laverania*.

(c) That there exists a malarial hæmoglobinuria, and a quinine hæmoglobinuria and a specific hæmoglobinuria (B W F), which may chiefly be differentiated by the presence or degree of jaundice present with other symptoms.

The Coorg Province affords a wide field for the investigation of tropical parasitic diseases, especially the protozoa and entozoa. I have observed the malarial plasmodium of several types and have given the diagrams of the varieties noted this year (1919). In 1917 I observed malarial parasites in a case of quotidian subtertian fever, probably *Laverania præcox*. In the dissection of leeches and ticks, I have observed Trypanosomes and Spirilla, the former probably *T. evansi* of surra, I have observed also *A. spirochaete* in a horse suffering from fever, anæmia and debility and passage of red water, *A. spirillum* in the fowl (*S. Marchouxi*?). Anchylostomiasis is a scourge in the province among the cooly class, and especially the plantation coolies, the admission rate for this disease in the Mercara Jail is nearly 100 per cent.

on first admission into the jail. All the hospitals show numerous cases of the disease, the dysenteries amebic balantidium and bacillary, etc., are very prevalent etc etc.

In conclusion if by this paper I have in any way assisted in the elucidation of the cause of the important disease black water fever my object has been fully attained. I desire to express my thanks to Lieut-Colonel C. Donovan, M.D., Madras for his kind and valuable assistance and especially for the excellent plates of slide 2 of my second case and that of Mrs C's case (I *præcor*).

*Abbreviations—*

B. W. F.—Black water fever

H.—Hæmoglobinuria

P. H.—Paroxysmal hæmoglobinuria

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## EPIDEMIC INFLUENZA IN AND AROUND THE CITY OF CALCUTTA

By SIR KOILAS CHANDRA BOSE, C.I.E.,

Calcutta

SCARCELY had the people of Barabazar time enough to shake off their remorse, and end the penance which according to the queer customs of their community, they had rigidly to observe to propitiate the goddess of small-pox who had visited their homes when another powerful enemy influenza knocked at their doors and soon trespassed into their households and attacked the inmates. It was about the middle of June 1918 that I came across a number of cases in Cross Street, which is not only the centre of the piece-goods trade, but also the harbour of imported epidemic diseases. It is generally from this street that the germs of contagious and infectious diseases are carried in all directions through the city. In the year 1890 when influenza visited Calcutta for the first time, it selected Cross Street to commence its work. Owing to the very prosperous condition of the piece-goods trade on account of the war, dealers from Bombay, which was badly infected, came to Calcutta to settle with their constituents in the most central part of the market. In course of one week, an epidemic fever, in its character and phases resembling the influenza of the West, had visited every nook and corner of the City of Palaces. In several houses all the inmates were simultaneously taken ill, and there was no one left to nurse the sick or to call the doctor. The menial establishment was not spared, and the

inconvenience suffered by the people can be better imagined than described. Business was suspended and shops were closed. The Postal Department had to curtail the number of deliveries of letters, and in many places Calcutta was like a city of the dead. Although the Assessor of Death was not very exorbitant in his demands, still the strength and energy of the citizens were almost exhausted and many of them had been carried to the very threshold of their eternal home. But after some five weeks all troubles were over, the normal standard of the health of the people was established and business was resumed. From the very cheerful aspect of things nobody could anticipate that virulent forms of recrudescence would soon take place and carry off people by hundreds. Early in September the death rate of Calcutta showed a distinct tendency to go upwards and before a fortnight had passed there was a cry for medical help from every part of the city. There was much discussion among medical men regarding the identity of the disease. Some of the leading practitioners preferred to call it "war fever", some called it dengue, whilst the majority declared it to be the influenza which was then prevalent in every part of the world. This time the disease selected for its victims the most useful members of families and did not much affect the menial establishment. The schools had to be closed. The municipality took up the matter in right earnest. Relief centres were opened to distribute medicines, both curative and prophylactic, free to the people, travelling dispensaries were requisitioned, and qualified medical men with their medicine chests travelled about in gharies through the lanes and alleys of the city to distribute medicine to the poor people. The Health Department tried hard to minimise the spread of the disease, and thousands of the people resorted to the district officers to have the prophylactic nasal douche, but all measures failed to prevent dissemination and the dispensaries had to be kept going throughout the year. The fell disease was no respecter of age, sex or nationality, save that it rarely affected sucklings. Climate had no influence upon it, and we had reports of influenza from all quarters, and even the sandy soil of Rajputana was not exempted from its operation. In fact, no country was immune.

With this short preamble I would now commence to deal with the main subject of influenza itself. In giving a short description of the disease I need not repeat what I have already said in my first paper, which I had to read before the Medical Society and which duly appeared in the pages of the *Medical Gazette*. From the ancient literature dealing with the epidemic diseases in India I find no mention of influenza in the Ayurvedic system of medicine which is supposed to be a complete encyclopædia of diseases that affect the human race. It is a pleasure to find that in the *Mushik Puran* there

is mention of bubonic plague and its spread through the rat population, with hints as to what should be done to avoid infection. In Castellani and Chalmers' book on tropical disease we find it stated that the ancient Hindus knew that mosquitoes were the carriers of a peculiar kind of fever. Undoubtedly there were keen observers amongst our Indian physicians, and it is a matter of regret that with the destruction of the Alexandrian Library we have lost all that they wrote relating to diseases of the country. The Egyptian and Arab physicians did not write anything about influenza, so beyond the description of the disease given in the volumes dealing with the epidemic diseases of Europe we have no authentic record on the subject. Previous to the year 1890 influenza was absent from the list of epidemic diseases of the country. There may have been mild cases of the disease, but no special attention was paid to its study.

*The causative factors of influenza*—It is probable that Pfeiffer's bacillus is the direct cause of the disease, but it is very difficult to isolate this from the many micro-organisms present in the nasal discharge, indeed it often appears to be absent, because of the presence of pneumococci, staphylococci and streptococci. My own conviction is that influenza is a peculiar kind of septicæmia caused by the toxins generated by the combined action of a group of bacilli amongst which Pfeiffer's bacillus has got its part to play. This accounts for the anomalous phases of the disease. My esteemed friend Dr G C Chatterjee Bahadur of the Pathological Department, who very kindly undertook to study the disease bacteriologically, has supplied me with notes of his experience which, for want of space, I cannot reproduce here. Dr J N Das Gupta has also thrown much light on the subject of the pathology of influenza and has written a paper on the subject. Atmospheric and telluric causes have little part to play in the production of the disease. The epidemic of influenza in 1890 was preceded by a heavy rainfall, but the rainfall of 1917 was normal. It is very difficult to say whether the intensity or virulence of influenza is modified by climatic influences, humidity and dryness of the atmosphere, but there is not the slightest shadow of a doubt that variations in temperature sometimes tell seriously upon the resisting power of the sick.

*Period of incubation*—It is very difficult to trace with any amount of certainty the exact period of incubation. Hundreds were taken ill within a few hours, whilst others who were real contacts were not affected until six days from the time of their exposure to its influence. The period, then, ranges from a few hours to six days. During the incubative stage some feel out of sorts but many do not feel anything and are quite capable of attending to their business affairs until they have to take to bed.

Although the disease is highly infectious, still instances are known where people who were constantly in touch with the sick escaped. There is no doubt that the disease is transmitted from individual to individual, and the nasal discharges from the sick are the direct causes of its dissemination. These discharges, when half dried up, are easily wafted by the wind, and dust impregnated with the germs of disease easily gets access into the air passages of people, who sooner or later fall victims. I have watched the first epidemic of influenza during the onset of the spring in 1890, I have also studied the phases of the disease during its advent in June and July 1918, during its recrudescence in September, and I think and believe that according to circumstances influenza undergoes change or alteration in its characteristic feature. During the first epidemic of 1890 the mortality was nominal. In the epidemic of June last the number of sick was great but the death rate was comparatively small. During the recrudescence from September till the middle of January the virulence of the disease was most marked, and the death rate was simply appalling. I will in this short paper deal only with the important and anomalous phases of the disease. From the very beginning of the disease the patient complains of heaviness of the head, and may have a peculiar sort of hacking cough with pain over the windpipe. Often there is slight hoarseness of the voice, which in some cases continues for weeks. There may not be any appreciable rise in the temperature, but the patient becomes dull and apathetic, and there is loss of appetite and insomnia. These symptoms last for three days and then gradually disappear, so that after a week the patient recovers his former health and goes about doing his ordinary business. In some cases the headache is intense, and accompanied by shivering, with a high temperature and suffused conjunctiva. There may also be present much aching in the limbs and pain in the joints, but little or no cough may be present. The temperature remains high for a day or two and then goes down, leaving the patient very weak. In many cases cough becomes troublesome and auscultation reveals general bronchitis. The temperature then shows a tendency to go up and pneumonic patches may now be detected. With the appearance of pneumonia the heart muscles become flabby, and gradually the first sound becomes muffled and then in most cases disappears altogether. In some cases expectoration is so free that the spittoon has frequently to be emptied. The temperature falls below normal and the skin is bathed in a cold sweat, while the blood pressure is very much reduced and the pulse becomes soft and in some cases intermittent. If the patient be wise and does not over-exert himself he may have a good chance of recovery, but in the majority of such cases the patient dies of cardiac failure.

*Epistaxis*—Epistaxis is commonly met with in cases of influenza, but as a rule ceases of itself. I have, however, seen some cases where epistaxis was a formidable complication and required active treatment to stop the hæmorrhage.

*Deafness*—From the very early stage of the disease the majority of patients complain of noises in the head. In most cases catarrh or inflammation of the Eustachian tube is present, and this may cause permanent deafness.

Some cases resemble intermittent fever. The following shows this—A Marwari gentleman, aged 22 had a distinct rigor on the 18th of September 1918, followed by high temperature (104 degrees F). On the following morning the temperature fell to 99 degrees, but towards evening the patient complained of feeling chilly, and the temperature rose to 103 degrees. Towards morning there was marked reduction in the temperature and just as on the previous day came down to 99 degrees. Intramuscular injection of quinine was given but with no effect. The temperature rose again to 103 degrees, but this rise was not preceded by a rigor. Next morning the temperature had fallen to 100 degrees and continued to range between 100 degrees and 103 degrees for a week, when auscultation revealed the presence of pneumonic patches. The symptoms gradually became grave. The patient became cyanosed, with an imperceptible pulse, and skin was bathed in a cold sweat. The patient ultimately died. I have seen several cases of this sort.

*Cyanosis*—In the present epidemic of influenza cyanosis was often seen and generally was the herald of death. The extensive mischief in the lungs was, of course, the cause of the cyanosis. The heart was embarrassed and its beats muffled. If the lungs could be cleared and their normal functions restored, the cyanosis vanished.

*Parotitis*—This was often seen, and usually during the decline of disease rather than during its acute stage. *Phlebitis* was another complication, which often brought about a fatal issue.

*Polyn neuritis*—Polyn neuritis is a grave complication of influenza, and requires the serious consideration of those who are interested in the study of the pathology of the disease. We often come across neuritis in cases of diabetes, enteric, diphtheria and other septicæmic fevers, but it is readily amenable to treatment and does not permanently cripple the patient. The neuritis of influenza, on the other hand, has blighted the prospects of many a promising young man. A patient apparently doing well and anxiously expecting to return to duty is suddenly struck down with hemiplegia or paraplegia. In the epidemic of 1890 cases in which meningitis of a mild or grave form was noticed did occur, but complete paralysis was conspicuous by its absence. During the late epidemic many cases

of polyneuritis came under notice. It was very difficult to detect the approach of neuritis or paralysis from the general appearance of the patients. Insomnia, headache and slight delirium during fever were often observed, but such symptoms were not often followed by neuritis, although in some cases they were the forerunners of insanity.

A man, aged 32, a clerk employed by an Indian mercantile firm, contracted influenza in December 1918, but he had a very mild attack, and his temperature never rose higher than 100 degrees, and on the fourth day the fever subsided and he felt well enough to go to work. In the evening, however, he had a return of the fever, the temperature rose to 103 degrees F and he complained of pain in the chest, his voice became hoarse, and on the following day all symptoms of influenza appeared. Cough was most troublesome, and auscultation revealed the presence of diffused bronchitis. He was somnolent and lay with his eyes half-closed. Influenza vaccine was tried and had an effect upon the temperature, which fell to 100 degrees, but with the fall of temperature his condition did not improve. On the 11th day he showed symptoms of myelitis, there was girdle pain over the muscles of the abdomen, he could not lift up his arms and his legs were stiff. His motor functions were rapidly lost. The reflexes were at first exaggerated and then disappeared. He complained of acute pain in the joints, and general hyperæsthesia of the whole body, but did not altogether lose control over his bladder and rectum. His articulation was not clear. Careful treatment improved his condition very much, but it took a long time before he could stand upon his legs. He is still very shaky. I cannot say whether the toxin of influenza was the direct cause of this neuritis or whether it was due to ultra-microscopic germs which were only brought into play by the advent of influenza.

*Chorea*—Chorea is another complication which requires special mention. It was observed in young children of both sexes. The involuntary movements came on weeks after apparent recovery from influenza. The symptoms lasted for many months and then gradually passed off. A healthy-looking Marwari boy, aged 15, got influenza along with other members of his family during the early winter of 1919. He was pronounced convalescent after ten or twelve days, and was allowed to return to his school. This was in November 1919. By the middle of December he manifested choreic symptoms which persisted for three months and then gradually disappeared. This boy is all right now, save that he has slight involuntary movements of the muscles of his arms.

*Diffuse general bronchitis* with profuse expectoration is a bad complication, as it exhausts the vital power of the patient. There may be patches of pneumonia which make the signs like those of capillary bronchitis until the

microscopic examination of the sputum reveals the true nature of the disease. In these cases the pneumococcus predominates over the micrococcus catarrhalis and streptococci. The prostration in the broncho-pneumonia of influenza is grave, and reason often fails to account for it. Incessant coughing produces rigid contraction of the muscles of the abdomen accompanied by tenderness, which requires special treatment for its relief. The rise or sudden fall of temperature is no guide to the practitioner to pronounce his verdict. In the majority of cases perspiration breaks out at the very onset of the pneumonia, and the sub-normal temperature does not necessarily expedite convalescence. Crepitations or râles from apex to base were not necessarily accompanied by high temperature. The peculiarity observed in these cases is that the expectoration was unusually profuse, and I remember one case in which the expectoration measured came to nearly four pints during 24 hours. Still the cough continued to be as troublesome as it was before. The expectoration is at first mucopurulent and thin, it soon becomes purulent and nummular. Occasionally there is expectoration of thick pus.

*Hæmoptysis*—Hæmoptysis was a common complication of the recent epidemic of influenza. Often the symptom yielded to rest and ordinary treatment, but sometimes it was of an alarming nature, and in a small number of my cases it was the direct cause of collapse and death. Nothing is more distressing to the sick than the appearance of *pleurisy* as a complication of the pneumonia of influenza. The area affected is always extensive. It often includes the diaphragmatic pleura and then causes great suffering. Hiccough becomes constant and worries the patient and is not easily amenable to treatment.

*Diarrhoea*—Diarrhoea is another formidable complication of influenza which was apt to be confounded with choleraic diarrhoea. The stools were passed involuntarily and in copious quantity, the urine was passed in drops and later ceased to flow. In some cases retching and vomiting occurred, making the picture very like that of cholera, but thirst was not nearly so urgent as it is in that disease. The stools were at first bilious, then serous, and sometimes contained flakes of tissue. The pulse was usually soft and compressible at first and then gradually imperceptible. In the majority of cases the temperature ranged between 99 degrees and 102 degrees F. Ordinary routine treatment and saline injections sometimes raised the temperature as high as 108 degrees, and ice-packing and injections of ice water were employed to bring it down. The general condition of these patients did not improve. In some the lungs became oedematous, the first sound of the heart disappeared, and the patient succumbed.

*Heart*—From the onset of pneumonia the heart becomes flabby and the pulse becomes soft and compressible. There may or may not be a

bruit. The first sound may be muffled or altogether absent and the patient complains of a sense of discomfort in the precordial region. The temperature alone cannot account for this change in the character of the pulse. The toxin of influenza has a tendency to affect the heart muscle. In most cases there was marked tachycardia. In a few there was bradycardia and cases are not wanting to show that the pulse came down to 32 in a minute.

*Arrhythmia cordis*—Arrhythmia of the heart is a peculiar trait in the clinical phase of the disease, and its effect upon the general condition of the patients is extremely unsatisfactory. Patients apparently doing well may succumb without any appreciable warning. One of the prominent members of the Marwari community had a smart attack of influenza along with other members of his family in November 1918. He had pneumonia affecting both lungs. He was kept in a very commodious house and every necessary arrangement was made to make him comfortable. His expectoration was copious and the spittoons had to be constantly changed. His temperature ranged between 100 degrees and 102 degrees. He perspired freely, with respiration 60. Under treatment the temperature came down to 98 degrees and respiration rate was reduced to 26, and the insomnia from which he suffered disappeared. But the heart muscle remained flabby and the first sound was still inaudible, and the pulse was irregular. His appetite, however, returned and the craving for food was intense. He was kept upon slops, and not allowed to sit up. One morning he woke up as usual and wanted his friends to bring him some food forthwith. He was cheerful and took interest in the report of his business affairs. A cup of milk was brought to him, but he could not take the cup in his hand. He complained of an unusual sensation over the precordial region, and his condition soon became alarming. Before the doctor could arrive he died. His brother-in-law, who was taken ill at the same time, also died of cardiac failure.

It is very difficult to say whether the present epidemic of influenza spread among the domestic animals. During the outbreak of influenza in 1890 the equine species badly suffered from a peculiar kind of distemper, highly contagious in its character and very fatal, which was generally known by the name of "pink eye." It is not for me to discuss here whether the pink eye of horses and influenza of men are one and the same disease. The bacteriologists alone can throw sufficient light on the subject. But "pink eye" was conspicuous by its absence during the recent epidemic. Dr J N Das Gupta in his admirable paper on the bacteriology of influenza has said that he succeeded in inoculating monkeys and guinea-pigs with the cultures taken from naso-pharyngeal discharges from patients suffering from the

virulent type of influenza. He found that rats are immune against influenza.

*Swelling of joints with effusion in influenza*

During the recent epidemic I came across a group of cases in which the disease simulated in every phase true rheumatic arthritis. When the effusion was great aspiration was necessary to give relief to the patient. In one case there was distinct accumulation of pus in the knee joint.

*Melana*—Hæmorrhage from the bowels is extremely rare in influenza, but that is no reason to say that melena is altogether absent during the course of the disease. My esteemed friend Dr Kartick Chandra Bose very kindly showed me two cases in which death was due to profuse flowing of blood from the bowels.

*Phthisis*—People whose resisting power was brought to its lowest ebb showed signs of phthisis during the decline of the disease and later the characteristic bacillus was discovered in their sputum. About 10 per cent of cases showed this sequel.

It may not be out of place to mention that the pluriitis of influenza is very insidious in its character. In some cases the inflammation subsides readily whilst in other it is apt to run a protracted course either with or without effusion.

Sometimes influenza simulates plague and it often becomes a puzzle for a practitioner to differentiate one from the other at the onset. The sudden rise of temperature with pain over the glands of the neck, red eyes, intense headache with slight delirium absolutely mask the true nature of the illness. This state of things continues for a day or two when the true nature of the disease reveals itself and characteristic features of influenza come into prominence.

Influenza often manifests symptoms of *cerebro-spinal meningitis*, and veteran clinicians often committed blunders in pronouncing their verdict. Besides stiffness of the neck, intense headache and delirium were present. Time alone could clear up the diagnosis, for Kernig's sign was not always present, and lumbar puncture did not throw sufficient light on the subject.

*Abortion* is very common in influenza and the hæmolytic action of the toxin of influenza favours hæmorrhage in many a case. Instances are not wanting to show that pregnant women can sometimes carry to term, and be delivered of a healthy child, but the majority of pregnant women die of influenza.

Like plague and epidemic dropsy, influenza promotes interstitial hæmorrhage within the structures of the eye. Eye complications are very common in influenza. Hæmorrhagic patches in the retina have made many a man blind. Optic neuritis, glaucoma and irido-choroiditis are the worst forms of eye complication. In his learned paper on "Influenza and the Eye," Dr J N Moitra has graphically

described a few cases in which influenza was the cause of blindness.

It must be admitted that unlike other specific fevers one attack of influenza does not offer protection against another. In fact one attack increases the susceptibility of the patients to subsequent attacks. In some cases vaccine treatment has been followed by very good results, but it is yet premature to say whether these cases were uncomplicated cases of the disease in which one could reasonably expect recovery in three to six days' time. In spite of the uncertain nature of the action of vaccine in the treatment of influenza, the tendency among the practitioners of the progressive class is to push it and to attribute every slight improvement to the use of the vaccine. It is a matter very much to be regretted that there is a morbid tendency amongst the rising generation of medical practitioners to overdo a thing. It is not for me to criticise their action, nor do I pretend to cure influenza by medicine simply. I simply say that there is no hard and fast rule for the management of influenza cases and each case ought to be treated on its merits.

As a member of the old school I would naturally myself refrain from doing things in a haphazard way. But that is no reason why I should pass for a man much behind the times. I simply urge the necessity of doing things in a scientific way and not to put much reliance upon the conjecture or surmise of the progressive practitioner of the present age. In a typical case of influenza with broncho-pneumonic complication the doctor comes and injects pneumococcic vaccine. His action is not followed by very hopeful results. He injects staphylococcic vaccine with no satisfactory result and subsequently he has recourse to streptococcic vaccine, and would continue to go on with his injections unless he be prevented by the patient or his friends. The human body is surely something more than a research laboratory! Professor B C Ray has given a fair trial to vaccine in the treatment of influenza, and I would ask him to write a paper on the subject. Of prophylactic treatment nothing is more safe and reliable than to quit the infected area and retire to a healthy locality. But this is a procedure which can never be adopted by the Indians, whose social customs are very much against it. The women of his family will cling to the bedside of the patient, to nurse him and do everything for his comfort, sacrificing the fundamental rules of hygiene. The slovenly habit of preserving the soiled linen saturated with sputum is to be condemned. The free use of eucalyptus or thymol inhalations is to be insisted upon. Occasional washing of the mouth and throat with common salt water will be a very useful prophylactic. It costs nothing but is of greater use than various medicated gargles. Free use of quinine sometimes prevents influenza, although opinions are not un-animous. The ammoniated tincture of quinine



has in many cases proved inert Quinine, Dover's powder and camphor sometimes act most beneficially in warding off an impending attack The treatment of broncho-pneumonia in influenza does not differ much from the ordinary routine treatment, but due care is necessary to protect the heart Strychnine and digitalis should be given according to the requirements of the case Insomnia is a constant complication of influenza and can be removed by the exhibition of Dover's powder and camphor Calomel relieves constipation Alcohol, which is very much deprecated by the leading men of the present age, is, in my opinion, an excellent thing and can be absolutely relied upon during prostration Musk and "makaradh-waj" are generally resorted to by irresponsible practitioners in anticipation that they may be of immense service in preventing heart failure This hybrid system of treatment is to be condemned Mercury can under no circumstances be a stimulant Aspirin and phenalgene are to be used with very great caution Rest in bed and avoidance of exertion are the only remedies to be relied upon in expediting convalescence

#### NOTE ON THE OPEN AIR TREATMENT OF PULMONARY TUBERCULOSIS IN MADRAS PRESIDENCY

By C F FEARNSTIDE,  
LIEUT.-COL., I M S (retd.)

##### CONDITIONS NECESSARY FOR TREATMENT

THE open air treatment of tuberculosis mainly consists of placing patients in the most healthy surroundings in open air chalets protected from violent winds and dust, good food, and regulated rest and exercise As a result of this treatment, temperature falls, night sweats disappear, cough is lessened, appetite returns, sputum decreases, and marked gain in weight and vitality follows

The tuberculosis institutions of which I have personal experience in England ensured these conditions They were surrounded by many acres of grass land free from dust, with no dusty roads, and had wind screens in the shape of woods where patients could remain all day even in a gale

The treatment of tuberculosis in Madras presents a far more difficult problem than in Europe in the first place, owing to the higher temperature throughout the year (in England patients do far better in the winter than in the summer), secondly, there are few trees to act as wind screens and for shade, and thirdly, for many months in the year the winds are laden with septic dust

The three essentials for the open air treatment in this part of India are —(1) Equable climate, (2) numerous trees, both for wind protection and shade, (3) freedom from dust The first two can be had easily in the Presidency and only require selection in the one case and

time on the other, but the last is most difficult to secure One does not need to be a tubercular patient to know the discomfort to nose, throat and chest caused by the dust-laden winds of the south-west monsoon In those suffering from pulmonary tuberculosis strong winds have a very deleterious effect on the healing of wounded tissue, especially when the wind inhaled is laden with bacteria-carrying dust whose flora are easily pictured by exposing a Petri dish containing sterile nutrient agar for a few moments The healing of the lung cavities depends entirely on air free of micro-organisms One can readily realise therefore how difficult it is to alleviate the symptoms of late cases or help to cure early cases The open air treatment in India therefore resolves itself into pure air treatment, and how this may be procured I shall show

##### FARM COLONY

The ideal place is an island in some large tank or, failing that, any high land lying between two tanks, lying south-east to north-west with the institution placed between them Wind passing from the north-east or south-west and *vice versa* during the monsoons will be practically dust-free, most of its impurities being deposited in the water As the water recedes during the warmer months the grass growing in the bed of the tank will decrease the amount of dust whisked up from the ground and at the same time furnish useful grazing for the cattle required to supply milk to the patients During these months the dust nuisance can also be partly counteracted by cus-cus (farm grown) tatties with continuous irrigation from above The moist atmosphere generated will greatly relieve cough when a very dry and hot air is blowing, which is very irritant to cases complicated by posterior rhinitis, laryngitis, etc Another advantage is that the water of the tank can be utilized by the patients for gardening, and watering trees and hedges, besides growing crops In other words, a farm colony is most suitable for the outdoor treatment of the tuberculous

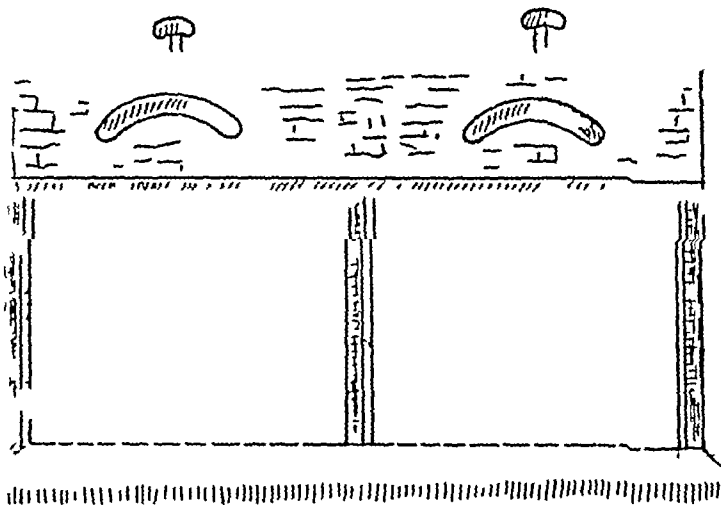
The sanatorium will shortly give place to the farm colony in the treatment of pulmonary tuberculosis, and I do not think there would be much difficulty in finding a suitable site such as I have mentioned where the dust nuisance would be greatly in abeyance Waste land might be taken up and artificial tanks made by utilizing the services of short-term prisoners to build the bunds No walls should be erected round the buildings, only an entanglement of barbed wire, of which there will be plenty available shortly from France It should be divided into two sections A—for latent cases and those in stages I and II, B—for advanced cases hospitalised which should be some distance away from A Section A should consist of chalets or well ventilated rooms, the usual treatment of rest and silence during certain hours being enforced in these chalets





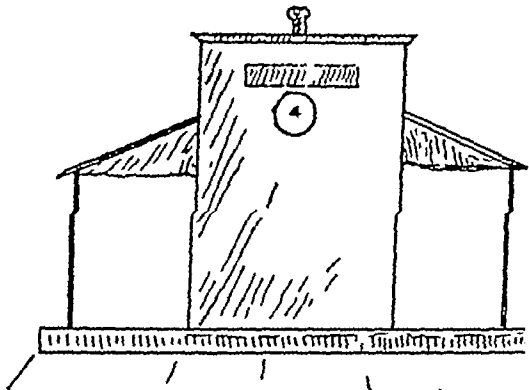
# NOTE ON THE OPEN AIR TREATMENT OF PULMONARY TUBERCULOSIS IN MADRAS PRESIDENCY.

By C F FEARNSIDE,  
LIEUT. COL., I.M.S. (retd.)  
CHÂLETS (ATTACHED)



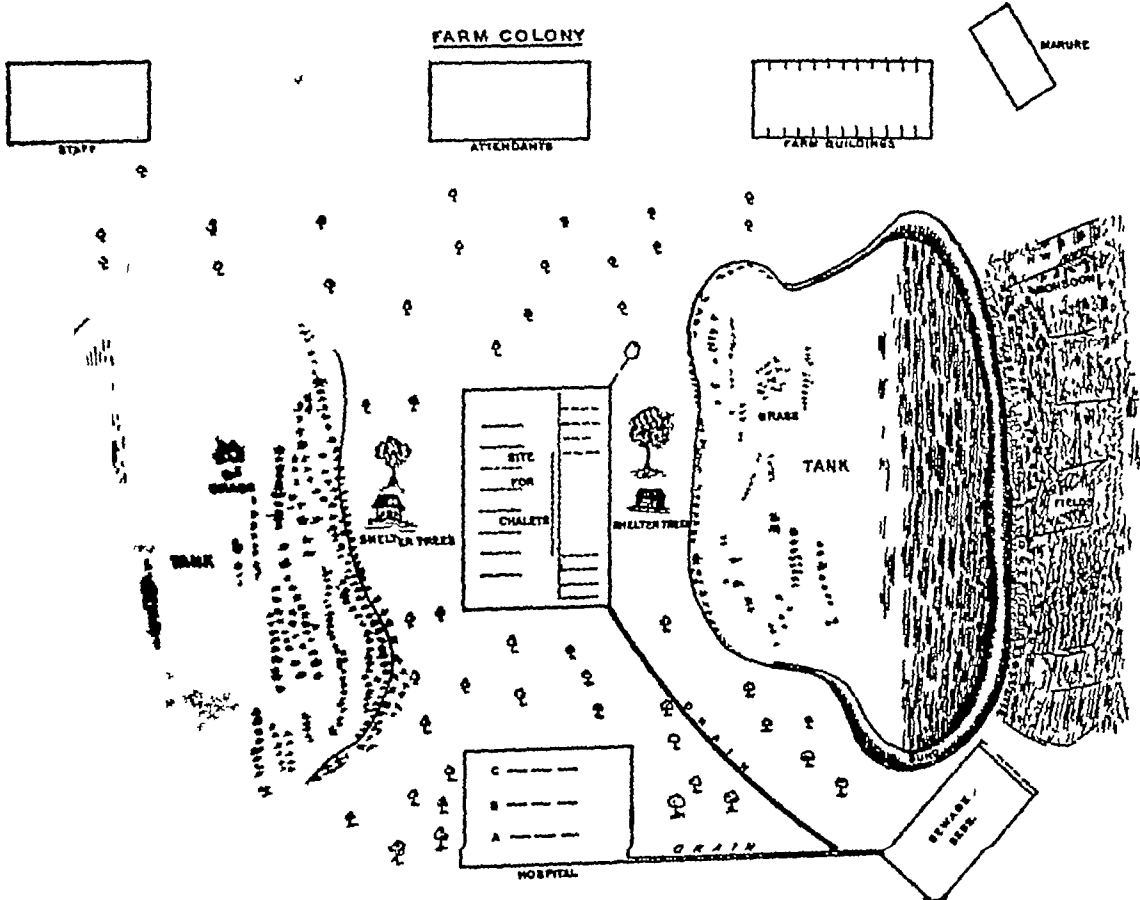
I

These can be constructed in rows open both in front and behind  
so that there is a free passage of air going on  
continuously.



II

SIDE VIEW OF No I  
Tatties (cus cus) can be placed all  
along the verandah.



## CHAULETS

The chalets should be in stages I and II of cure and be located in chalets. The ventilation can be decided by the double exposure. It is not necessary to isolate the patients from those whose sputum contains tubercle bacilli. The rows of chalets can be divided into patients in the different stages of disease and according to the work and exercise proposed by the doctor. It is a well known fact that healthy attendants of patients are not infected by the disease. The plan of chalets are suggested—(1) Decided and (2) undecided.

(1) Chalet with low parapet wall and the upper part open and protected by chulsi or bamboo. There should be a verandah in front and behind so that the patient can sleep directly in the open air at night. The room should be occupied during rest hours or in the evening. Room Mangalore style with the chulsi boarding the eaves being extended well out on both sides, or better still, a bamboo screen. These chalets can be placed side by side from one another in rows. There is a roof of Cuddipah slabs or red tiles. There are four pillars, which retain the roof and support the old rails should be utilized to support the roof.

(2) In these the side ventilation will not be so good and the treatment will not be so effective. They should consist of a number of rooms side by side open in front and behind so that the air may pass freely through. These rooms should have deep double verandahs which help to keep the rooms cool during the day and can be utilized for the patients to sleep in at night.

## HOSPITAL

The hospital buildings should be placed at a good distance away from the chalets. The hospital should consist of three wards. (A) for those who have a temporary setback, e.g., hemorrhage, pleurisy, systemic disturbance, (B) for those in the later stage, whose comfort should be mainly attended to since the prognosis is bad, (C) for surgical cases. It is better to have upstairs buildings open all round with verandahs on both sides so that patients may be placed in the verandahs when necessary. The wards should be open above with a wall of planking 3½ in to 4 in high to protect the beds from any strong winds, all above that being open. Iron uprights instead of brick pillars for the free passage of air should be utilized. Ordinary chucks or those of the roll top desk pattern or tattles of cus-cus for dust protection should be put up on both sides so that any strong breeze can be neutralised. A "D" ward should be cut off from the main ward at the end for moribund cases. The ground floor of the wards can be utilized for those patients who are able to come down during the day.

## WORK

With an ample supply of water the patients can be employed in garden work, such as preparing the ground for vegetables, sowing seeds and weeding and especially planting tamarind, acacia and other good shade trees, but for how many hours a day this will be possible experience alone will determine. Working in the middle of the day in the hot sun may be found to be injurious on account of systemic disturbance, and it may be found necessary during the hotter hours of the day to employ the patients in open air workshops, chopping and sawing wood, weaving and other industries. Some alteration of the rest hours from those usually given in temperate climates may have to be made. During rainy days they will also have to be under cover. Open air workshops such as have been constructed for ordinary healthy prisoners in Combaratore Jail are the most suitable, being of simple design and inexpensive.

To each patient should be allotted his work daily or weekly as the case may be, provided there is no setback, such as a rise of temperature, loss of weight etc. and he should wear a coloured disc on his coat indicating the work assigned him for the week. In a smaller institution this may not be necessary, but where there is a large number with several medical officers it is absolutely necessary to prevent patients doing other than their allotted work. The exercise begins with walking exercise and is graded up to heavy digging work and physical drill but all must have the prescribed hour's rest one hour before each meal during the day. In India this may have to be altered to several hours' rest in the middle of the day or it may be absolutely necessary to have the patients at work under cover during the hotter hours of the working day. Milk being an important and costly item in the dietary the patients can look after the cows which should form part of the farm colony, and thus help to diminish the expense of diet.

## DISPOSAL OF INFECTED MATERIAL

The disposal of the faeces, urine and sputum in England is a simple matter as they pass into the usual sewers after disinfection. In India there is only the dry-earth system of getting rid of highly infectious material. It is a known fact that the tubercle bacillus is destroyed in a few hours if exposed to the sun in the tropics, but it may in favourable conditions survive for a year or more. It is not known at present how long the tubercle bacillus may remain virulent if buried with the nightsoil. The only safe method in my opinion is to dry and incinerate the infective material a method recommended in getting rid of ankyllostoma and other ova. It is certainly inadvisable to utilize the nightsoil for gardening and farm manure because of risk to the herd or cows which will supply milk to the colony. The sputum mixed

with sawdust or chopped straw should also be incinerated. The watery elements of the sputum, urine and faeces can be evaporated in cauldrons over an oven and the dried material utilized as fuel. This, of course, should be done some distance from the main buildings in a special shed.

#### TUBERCULAR PRISONERS

It is proposed to construct buildings for tubercular prisoners to the north of Coimbatore Jail, the site alone costing about Rs 27,000. How far does this site meet the requirements for the successful treatment and alleviation of the symptoms of those affected? It is an open, treeless field, wind-swept during the monsoon months, with semi-black cotton soil. On the west side is a main artery to the town whence clouds of dust sweep across it daily during the south-west monsoon. It is within municipal limits (which fact alone condemns it) with rising suburbs to the east as well as to the west between which will be a number of tubercular patients in close proximity. The danger of the contaminated soil being blown to these areas is obvious, and no amount of training of Indians in protective methods will prevent their contaminating the soil for many years to come. They, however, are not alone in this respect, for it is very difficult to convince educated European patients of the danger they are to others. Another grave danger is the spread of the disease by flies. In Port Blair it was with the greatest difficulty that this nuisance could be kept down in the large tubercle wards, owing to the fact that the prisoners would not realize the danger of infection to others from this source. What applies to the two suburbs mentioned equally applies to the prisoners in Coimbatore Jail and the Police Recruit School, *viz.*, there is considerable risk of dried infected sputa, etc., being blown into the prison and thereby risking the health of the inmates. Incarceration at all times has a depressant effect, and if to this is added the frequent mental depression so common amongst those suffering from tuberculosis, how can any good results accrue? Further, high walls on still days become very hot and occlude any little breeze that may be blowing at the time and give off heat at night. This is not conducive to the reduction of temperature, which is one of the features of the fresh air treatment.

#### TREATMENT OF KALA-AZAR WITH INTRAMUSCULAR INJECTIONS OF HYPER-ACID ANTIMONYL TARTRATE (+URETHANE)

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SINCE the discovery of antimony as a specific in the treatment of kala-azar, attempts have

been made to discover a preparation which could be given intramuscularly without local reaction. The ordinary antimonial preparations, such as tartar emetic or antimonyl sodium tartrate, give rise to violent local reaction and cannot therefore be used intramuscularly.

Caronia has used acetyl-p-aminophenyl-stibiate of sodium intramuscularly in the treatment of infantile kala-azar with good results and subsequently it was used by Kharina-Marinucci.

In seeking for a preparation of antimony which will give little local irritation, we should use one which will be quickly absorbed without dissociation or decomposition. Such a preparation I have found in hyper-acid antimonyl tartrate (+ urethane). It is very soluble in water, stable in aqueous solution for indefinite periods, and is quickly absorbed without decomposition after intramuscular injection. As urethane is not a base, it probably remains in solution with the antimonyl compound in the form of a mixture.

Experiments are being conducted by me to determine its toxic dose as compared with its curative dose, and, so far as I have been able to determine, it appears to be the least toxic of all the antimonial preparations and its curative dose seems to be much smaller than that of other antimonial preparations. Further observations on this subject will be communicated in a future paper.

The following are the series of the first four successive cases which have been treated successfully with this compound. In each of these cases the diagnosis was made by the presence of the L. D. bodies in the spleen and the cure was shown by their disappearance therefrom—

1 Patient B S was admitted into my ward on 25-9-19, with the spleen extending 6 in below the costal margin in the left nipple line. He was given intramuscularly  $2\frac{1}{2}$  c.c. of a 2 per cent solution of the hyper-salt with urethane. Altogether 14 injections were given from twice to four times a week. The results of treatment were as follows—

(1) R.B.C.—2,800,000, W.B.C.—1,800, Hb—46 per cent on 26-9-19 (before treatment)

(2) R.B.C.—4,700,000, W.B.C.—13,800, Hb—60 per cent. on 5-1-20 (after treatment)

There is marked increase in weight, the spleen cannot be felt below the costal arch, and no L. D. bodies can be found on spleen puncture and the fever has subsided.

2 Patient M was admitted into my ward on 23-8-19 the spleen extending 5 in below the costal margin in the left nipple line. He was given  $2\frac{1}{2}$  to 5 c.c. of a 2 per cent solution of the hyper-salt with urethane intramuscularly. Altogether 15 injections were given from twice to four times a week. The results of treatment were as follows—

(1) R B C—3 300,000, W B C—2,200, Hb—38 per cent on 8-9-19 (before treatment)  
(2) R B C—4 600,000, W B C—16 000 Hb—60 per cent on 23-12-19 (after treatment)

There is a marked increase in weight and the spleen can just be felt below the costal margin and no L. D. bodies can be found on spleen puncture and the fever has subsided

3. Patient R B. was admitted into my ward on 27-10-19 the spleen extending 3 in below the costal arch in the left nipple line. He was given 17 injections intramuscularly in doses of 2½ cc of the 2 per cent solution every two to three days. The results of treatment were as follows—

R B C—3 300,000 W B C—2 200, Hb—46 per cent on 29-10-19 (before treatment)

R B C—4 900,000, W B C—10,400, Hb—60 per cent on 19-1-20 (after treatment)

There is marked increase in weight and the spleen cannot be felt below the costal arch and the fever has subsided and no L. D. bodies can be found on spleen puncture

4. Patient B. was admitted into my wards on 6-11-19 the spleen extending 3½ in below the costal arch in the left nipple line. He was given only 5 injections of the hyper-acid with urethane at intervals of 3 to 4 days in doses of 2½ cc of 2 per cent solution

The results of treatment were as follows—

R B C—3 100,000 W B C—2,400 Hb—48 per cent on 12-11-19 (before treatment)

R B C—4 800,000 W B C—12 600 Hb—60 per cent on 20-1-20 (after treatment)

There is marked increase in weight the spleen cannot be felt below the costal arch and no L. D. bodies can be found on spleen puncture and the fever has subsided

As regards local irritation there is in some cases some amount of swelling at the site of injection which subsides quickly. No abscess or necrosis was found in any of the cases. The highest dose was 5 cc of a 2 per cent solution calculated in terms of the amount of Sb, O, present. No reaction in the form of rigors high fever or cough was observed in any of the cases. The number of injections given up to now to all my cases numbered nearly 100. Another series of cases is being treated with the same compound.

I have subsequently found that a 1 per cent solution is almost absolutely painless. It appears to me that the use of the hyper-acid antimonyl tartrate is one of the greatest advances in the treatment of kala-azar.

Very recently I have prepared urea-acid antimonyl tartrate, and a trial is being given to it by intramuscular injection in kala-azar. The results of these observations will be published in a future communication. So far it seems to be promising.

## ABSCESS OF BRAIN DUE TO CHRONIC EAR DISEASE

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Civil Surgeon, Myaungma

CHRONIC SUPPURATIVE OTITIS MEDIA is a disease the importance of which, as a menace to life is imperfectly comprehended by the general public, but, as the notes of the following case show, its presence carries with it a grave risk and at any time it may suddenly put an end to the patient's life by the extension of infective processes within the cranium.

*Clinical history*—A Burmese male prisoner, aged 29 years, was sentenced to two years' rigorous imprisonment on the 28th April, 1919 and on admission into the jail with the exception of a discharge from his left ear and deafness, he was apparently in good health. After the usual period of segregation he was passed as fit for hard labour. For nearly four months he got on very well. He occasionally came to the hospital to have his ear attended to, but he never had any temperature and never complained of headache nor indicated any brain symptoms. There was no bulging nor oedema over the mastoid and no tenderness to speak of. He gave a previous history of otorrhoea, but beyond this he had no memory of the early stages and could say nothing. There was no history of tubercle. On examining the ear with the crude means at my disposal, I noticed that there was a free discharge of pus from the middle ear and it was thin and smelly. The whole of the membrane had undergone destruction and the inner tympanic wall was widely exposed, secreting pus. As there was nothing to indicate the approach or actual presence of grave complications, operative interference was not considered necessary, and it was thought that syringing the ear with antiseptic lotions and hydrogen peroxide drops would do. Quite unexpectedly on the 15th August, 1919, he had a rise of temperature, and it was thought that it might be due to malaria. The fever, however, did not go down and he was therefore admitted into the hospital on the 19th and next day he began to show head symptoms and his condition became serious. He now complained of severe headache, vertigo and pain in the ear. He had a rigor and his temperature went up to 104.4 degrees F. The discharge smelt badly. On 21st he became delirious and began to pass faeces involuntarily in bed. The temperature did not come down, and it was thought that in this hopeless condition mastoid operation would do him no good. The case was too far advanced for operation, and at 3 P.M., on the 23rd, he expired.

A post-mortem examination was held next day. On removing the skull, the dura mater on the left side looked dark and congested. On cutting into it pus oozed out and the whole of the left hemisphere was covered with it. On

removing the brain the bones in connection with the left ear were found necrosed and the mastoid cells full of pus. On cutting into the brain the substance was found to be highly congested, the left lateral ventricle was full of pus and the choroid plexus dark and congested, in the right ventricle was sero-sanguineous fluid. The right auricle and ventricle of the heart contained ante-mortem clots. The spleen was enlarged, congested and friable.

An interesting point in this case is the complete absence of oedema over the mastoid, with no tenderness and no rise of temperature until meningitis actually set in and no signs of brain complications. Up to the 15th of August there was no complaint of anything except the presence of discharge and of deafness, which threw me off my guard and prevented me from doing the mastoid operation in time.

This disease must have existed in a quiet condition for years and slowly led to caries and necrosis of the bony wall, and yet there was nothing to indicate the approach of danger in this case.

## RUPTURE OF GALL-BLADDER

By W C KANE, B.A., L.M. & S., B.M.

*Officiating Civil Surgeon, Khandwa, C. P.*

VERY few cases of rupture of gall-bladder with gall-stones lying free in the peritoneal cavity are on record. As the following case, although it occurred some years ago, may be of some interest to your readers on account of its rarity and of the wonderful recovery she made I give it below with the kind permission of Colonel W H Kenrick, I.M.S., Civil Surgeon, Jubbulpore.

Miss K, aged 39, was admitted in the Victoria Hospital, Jubbulpore, on 10th March, 1910, with symptoms which indicated obstruction of bowels, *i.e.*, abdominal distension, vomiting (which was bilious and not faecal) and absolute constipation, not even flatus being passed. Pulse weak, rapid and thready. Features drawn and anxious looking, respiration thoracic. Unfortunately the temperature was not taken, as she did not appear to have fever. It was ascertained that the patient had a severe attack of pain in the region of gall-bladder early on the morning of the 7th March, 1910, which was subsequently referred to the right shoulder. Morphia did not relieve her much. Gradually the symptoms given above made their appearance.

*Previous history*—The patient was quite well till September 1902, when she began to have frequent attacks of bilious vomiting with sensation of discomfort in the right hypochondriac region. These attacks continued off and on till November 1909, when she got a typical biliary colic attack, since then, till the time of admission, off and on she used to have these attacks.

About a month before admission she was laid up in bed on account of the attacks coming on every third or fourth day. Her work necessitated irregular hours of food and moving about in the sun.

*Operation*—The abdomen was opened by Colonel Chapman, C.I.L., I.M.S., the then Civil Surgeon, in the middle line with the usual incision below the umbilicus, and some time was spent in searching for the seat of obstruction which was supposed to exist from the signs and the symptoms present. The coils of intestines were seen covered over with shreds of recent lymph, but no distinct lesion could be found although at one place in the small intestines a small cicatricial contraction was noticed, probably the result of some previous ulceration, but this could not explain the grave condition of the patient. Evidently there was peritonitis and there must have been some cause for it. Having had the history of biliary colic it was thought proper to explore the region of the gall-bladder, so an oblique incision about 4 inches long and about half inch below and parallel to the right costal margin was made and the abdomen opened. No sooner Colonel Chapman had put his hand in to explore the gall-bladder than he came across a good number of gall-stones lying free in the cavity, about 50 were taken out. They varied in size, the smallest being about the size of a gram seed and the biggest about the size of a walnut. It was found that the gall-bladder had been ruptured and there were adhesions all round. As the patient's condition at this stage was very critical, nothing further was done than putting in two glass drainage tubes—one at the bottom of the incision in the middle of the abdomen, and another in the second incision. The abdominal walls were hurriedly sutured together. The condition of the patient for the next two days was very serious. The pulse was thready and 140 per minute, although the temperature never rose higher than 100 degrees F.

The dressings had to be changed three or four times a day owing to the constant oozing out of bile through upper wound. Tympanitic condition of the abdomen and the tense feeling remained the same, on the 3rd day the tympanitis was slightly lessened and the patient passed flatus and a small clay-coloured motion in the middle of the night. The pulse also improved in force.

After this the patient made a gradual but uninterrupted recovery, the wound in the region of the gall-bladder having taken a little longer to heal up. She was discharged cured on 30th April, 1910.

Except a little digestive trouble occasionally, she appears to be in excellent health and is doing her work. No ventral hernia nor any attacks of biliary colic have occurred after the operation.

The only question in this case is whether one could have avoided the first incision.

## A Mirror of Hospital Practice

## FIFTEEN CASES OF OVARIAN TUMOUR TREATED BY OPERATION

BY KSHETRA MOHAN GUPTA, M.B.

Mahashadal Raj Hospital

Serial No	Age	Caste.	Menstrual history	Duration	Size of the tumours	Number of ovaries affected	Nature of the fluid and its amount	Weight.	Nature of the tumours	Complications	Emergency method adopted during operation	Special features of operations	REMARKS AND RESULTS
1	50	Hindu	Menopause	4 yrs	Coconut	One	2 pints of straw coloured fluid		Cystic	Adhesions to bladder in testine and omentum		Removal of piecemeal Bladder was punctured who saw atting adhesious (liged by catgut sutures	Bladder gave no trouble. Stitch abscess. Some of superficial stitches were removed on the 8th day. Operated on 23rd March and discharged cured on 3rd May, 1911
2	40	Do.	Dysmenorrhœa	1½ yrs	Do	Do	1½ pints of tarry fluid		Do	Adhesions, a few		Shelled out	Uninterrupted recovery
3	35	Do	Amenorrhœa	2 yrs	33" long, 30" broad	Do		.01b	Solid	Close adhesion to uterus	(i) Intravenous saline (ii) Strychnine (iii) other	No stalk Tumour shelled out Supravaginal hysterectomy	Uninterrupted recovery Operated on 18th July 1914 by charged cured on 11th August, 1914
4	44	Do	Scanty	1 yrs	Full term pregnant uterus	Do	8 pints of brownish yellow fluid		Cystic	Adhesions, a few			Uninterrupted recovery Operated on 8th August 1914 Discharged cured on 12th September, 1914
5	26	Do.	Menorrhagia	2 yrs	Orange	Do	4 ounces of straw coloured fluid		Do	Adhesions, a few uterine fibroids (i) Subperitoneal Size—(i) coconut (ii) Subperitoneal Size—Tennis ball (iii) Interstitial Size—Orange	Strychnine, digitalin injected	Supravaginal hysterectomy	Primary union Operated on 27th November 1914 Discharged cured on 1st January, 1915

## FIFTEEN CASES OF OVARIAN TUMOUR TREATED BY OPERATION—(Continued)

Serial No	Age	Caste	Menstrual history	Duration	Size of the tumours	Number of ovaries affected	Nature of the fluid and its amount	Weight	Nature of the tumours	Complications	Emergency methods adopted during operation	Special features of operations	REMARKS AND RESULTS
6	62	Hindu	Menopause	1 yr	Coconut	One		10 lb	Solid	Adhesions			Uninterrupted recovery Admitted on 26th April, 1915 Discharged cured on 12th May, 1915
7	35	Do	Scanty	1 yr	Full term pregnant uterus	Do	12 pints of straw coloured fluid.		Cystic	Do			Uninterrupted recovery in 24 days. Stitch abscess
8	34	Do	Amenorrhœa	2 yrs	Do	Do	10 pints of straw coloured fluid		Do	Do.			Stitch abscess Admitted on 12th January, 1916 Discharged cured on 23rd February, 1916
9	40	Mahomedan	Scanty	2 yrs	Do	Do		24 lb	Solid	Do		No stalk Shelled out.	Uninterrupted recovery.
10	28	Hindu	Do	1 yr	Do	Do	11 pints of straw coloured fluid		Cystic	Do			Do
11	30	Do.	Do	2½ yrs	Larger than full term pregnant uterus	Do	30 pints tarry fluid		Do	Do			Biggest one operated reaching up to xiphisternal articulation Uninterrupted recovery
12	38	Do	Amenorrhœa	2 yrs	Full term pregnant uterus	Do			Partly cystic	Do	Strychnine injected		Uninterrupted recovery
13	40	Do	Do	3 yrs	Coconut.	Do	2½ pints of straw coloured fluid		Cystic	Adhesions A sinus leading into the cyst due to tapping by a quack	Do	Intestinal wall torn open for 2" Closed by catgut sutures	No septic trouble Discharged cured within a month Primary union Stich abscess
14	40	Do	Scanty	1 yr	Orange	Do	3 m p of yel lowish fluid.		Do	Nil			Uninterrupted recovery.
15	38	Do	Amenorrhœa	1 yr	(1) Coconut, (2) Orange	Both the ovaries were affected			Partly cystic	Adhesions, a few			Uninterrupted recovery within 20 days (1919)

ADHESIONS gave trouble in some of the cases

In most the tumour, after its contents were evacuated, was removed easily after ligature, by double interlocking ligatures, of the pedicle. The pedicle stump was covered with peritoneum. Those tumours which had to be shelled out had their sites covered by peritoneum carefully

stitched  
The abdominal wound was closed in three layers, and the patients were kept on rigidly fluid diet for the first week. For the first twenty-four hours nothing save sips of hot water was given by the mouth. The dressing was changed on the seventh day, and on the

fifteenth all stitches were removed and the abdomen strapped. As a rule a dose of calomel was required on the third day. The patients were not allowed to walk about for a month after the operation and were given abdominal belts. All with whom touch is kept are in good health

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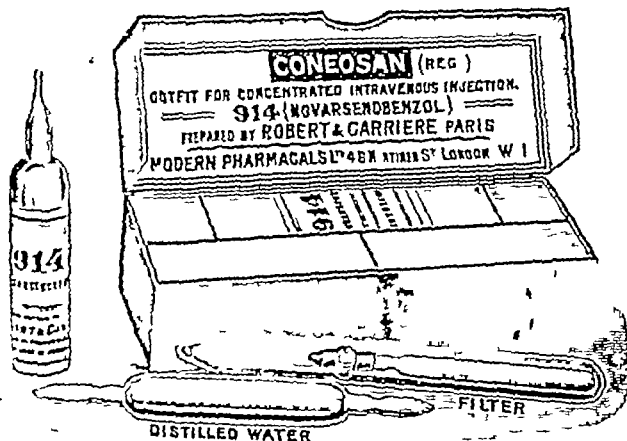
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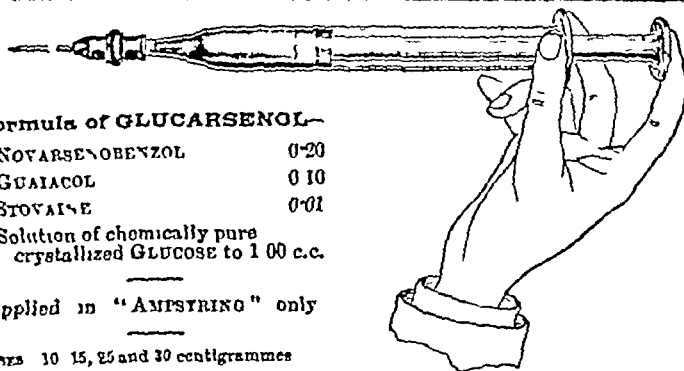
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# Indian Medical Gazette.

MAY

## DLATH IN THE POT

To the laity the symptoms of so-called ptomaine poisoning are well known. After partaking of the poisonous food, which in most cases contains no ptomaine, the unfortunate individual is suddenly seized with great pain in the belly, and passes copious watery, greenish and very offensive stools. He may also have distressing vomiting. Soon he becomes collapsed with his skin bedewed with cold sweat, and he has a feeling of impending death. The temperature is generally elevated. Headache and giddiness may be prominent symptoms.

In such a case the patient will generally assert that the food "looked all right," or was "certainly not tainted", for the popular belief is that for "ptomaine-poisoning" to occur the offending material must be appreciably altered in appearance, smell or taste. But this is not so. Indeed so innocent may the food seem to be that at Ghent in 1895 the slaughter-house inspector, who was a veterinary surgeon, was so sure that the saveloy, which was suspected to be the cause of the outbreak of food-poisoning, was "good" that he ate some of it to prove its harmlessness. He died on the sixth day, and from his body the *B. enteritidis* Gaertner was recovered.

This microbe was first isolated in 1888 by Gaertner, who investigated an outbreak of food-poisoning at Frankenhausen, in which the flesh of a cow that had been killed because it was suffering from enteritis caused serious symptoms in many persons. From the organs of this cow, and from the body of the fatal case that occurred, this bacillus was isolated, and it and others of the group *Salmonella* are now known to be by far the most frequent cause of bacterial food-poisoning. This group comprises *B. enteritidis*, *B. paratyphosus* A, *B. paratyphosus* B, and *B. supestifer*, which latter type includes *B. typhi murium*, and perhaps *B. psittacosis*. Any of these may be conveyed to meat, vegetables or fruit by flies, which may harbour them in their intestines for seven days, by rats and mice, which may be healthy carriers of one or more members of the group, or by direct

contamination during the process of preparation, or after cooking, of the food.

Cooking may intensify the poisonous nature of the food, by slaying the saprophytes which are present and by their presence prevent the multiplication of pathogenic bacteria. Thus pasteurised milk and sterilised brawn become very dangerous when infected after exposure to heat. Besides, cooking does not by any means always imply the death of any pathogenic bacteria present. An *over-baked* pie had its centre heated only to 86.6 degrees C, a ham weighing 16 lb. after boiling for 2½ hours had an internal temperature of only 44.5 degrees C, a tin of meat that had been boiled for five hours had not had its centre heated to boiling point, and a dish apparently so easily cooked as is *spaghetti*, when cooked in a hot-air steriliser until it appeared to be *overdone*, had not had its centre even pasteurised.

More than this—the Gaertner group of bacilli can be killed easily enough by heating to 60 degrees C for half an hour, but their toxins are extremely resistant to heat. Even 100 degrees C for half an hour will not destroy them, which fact explains why meat, that has caused an outbreak of food-poisoning because the toxins of the bacilli which it harboured were intact, affords no material for culture, because the bacilli themselves had all been killed by the process of cooking.

Much has lately been written about botulism—sausage-poisoning. Its symptoms differ much from those of the ordinary food-poisoning. They are thirst, dysphagia, obstinate constipation, mydriasis, paralysis of accommodation, nystagmus, internal strabismus, and the temperature is never elevated, but generally subnormal. There are no cramps, and consciousness is retained till the end. In fatal cases all the symptoms of bulbar paralysis may be present. As a rule the food which contains the *B. botulinus* is appreciably tainted. Were it the rule that the brine used to pickle meat should contain 10 per cent of common salt, botulism would be very rare, for the microbe that causes it cannot live if more than 6 per cent of salt be present. Ptomaines are poisonous, but are only produced when, as the result of putrefaction, the meat containing them has become far too offensive to be sold or eaten. "Tainted food is universally suspect, possibly quite justifiably suspect, but neither the degree of its malevolence nor the precise cause of its

harmfulness has been placed upon a scientific foundation "

These are a few of the points on which a recent work\* gives us reliable, because carefully-sifted evidence. Obviously we in India should know all that there is to know about food-poisoning for the carelessness of the cook, the incurably dirty habits of many of the domestics, the high temperature of the air and its often great bacterial content with the frequent necessity of using tinned provisions, make the subject one of perennial interest to all of us

A GREAT MAN, a Prince of Science has left India. All through his service here he tried to save India from herself. How well he succeeded we of the medical profession know. When he came to India, tropical abscess of the liver killed its tens, dysentery its hundreds and cholera its thousands every year. Now, thanks to him, abscess of the liver is a rarity, for we all know that it is caused by amœbic dysentery and that when intelligently treated by means of emetine this dysentery is controllable. Whereas formerly 60 per cent of all treated cases of cholera died, and in some epidemics at their height the mortality reached 80 per cent, now this pre-eminently Indian disease slays only 20 per cent of its victims. When kala-azar was recognised as a clearly-defined disease it had already slain 35 per cent of the inhabitants of the Nowgong tract, and its spread thence was noted with foreboding. Now its spread has been checked, and its mortality instead of being 75 per cent is less than 5 per cent. Recently leprosy was looked upon as incurable, now we know that it can be cured in the earlier stage, and that in the later stages the hideous disfigurement caused by its ravages can be, to a great extent, prevented. Tubercle, the great white plague, had only a few cures and many, many failures to record as the result of treatment. Now there are indications that its fat-coated bacillus, like that of leprosy, can be disintegrated by the use of soaps introduced into the organism.

All this has been the work of one man, who has left behind him in India thousands who but for him would long ago have died. Could any man desire more glorious fruition of his life's work?

Honours have come to him. The Royal Society has admitted him to its fellowship. The King-Emperor has created him a Knight Bachelor and bestowed on him the Companionship of the Order of the Indian Empire. Doubtless promotion in this or a superior order will soon be his, honour to whom honour is due.

But we are proud to think that of all things he rejoices in having had set up in the Calcutta School of Tropical Medicine a bust of himself which was subscribed for by those best fitted to judge of the benefits to humanity that have accrued from his work—his medical brethren. There is not a village in the wide world in which at least one man, the doctor, does not know and reverence the name of Leonard Rogers. He has gone Home to carry on his work on tuberculosis. Long may he live to work for the good of his fellow-men!

## Current Topics.

### The Diagnosis of Acidosis.

*Charlotte Medical Journal*, January, 1920,  
Vol 81, No 1

ACIDOSIS has for years past been one of the fields of romance in medicine. The term has lacked a satisfactory definition, but has been used glibly in explanation of obscure conditions, often without a very clear conception of its real significance, and at times has been applied to conditions in which real acidosis can play no part. Moreover, unless the acidosis is marked, the diagnosis may present extreme difficulty. It is a great pleasure therefore to find such a clear and sanely critical review of the subject as that presented by Macleod (*Journal of Laboratory and Clinical Medicine*, 1919). He recounts the development in the use of the term, which was at first limited to the undoubted acidosis existing in cases of diabetic coma, then gradually extended to include all cases of acetonurra, and later included those conditions in which the acid production or retention involved entirely different types of acids. The difficulty in early diagnosis is depended partly upon the lack of an adequate conception of the disease process, but chiefly upon imperfection in technique of the methods used.

The desideratum is an estimation of the total alkaline reserves of the body. The author points out the difference between hydrogen ion concentration and titrable acidity, explains the errors inherent in titration methods when applied to blood or body fluids, and shows the superiority of the colorimetric method, using phenolsulphonephthalein and a set of solutions of known hydrogen ion concentration. The total alkaline reserves of the body are the alkalinity of the plasma, the alkalies of the corpuscles, the

\* Food-poisoning and Food-infections, by W G Savage, B.Sc., M.D., D.P.H. Cambridge, 1920. University Press. Price 15s nett.

protein of the blood and finally the alkalies and proteins of the tissue cells. The "buffer action" of these alkalies depend on the plasma on the ratio  $\text{H}_2\text{CO}_3$   $\text{NaHCO}_3$  and in the corpuscles and tissue cells also upon the ratio between the dibasic and monobasic phosphates. Now the percentage of  $\text{CO}_2$  in the alveolar air must be a measure of the available  $\text{NaHCO}_3$  in the blood but in the methods now used

the alveolar  $\text{CO}_2$  can serve as an accurate index of the acid base equilibrium of the blood only under certain controlled conditions and these conditions are difficult of attainment. Direct examination of the blood as to its content of  $\text{NaHCO}_3$  avoids certain errors but still yields figures short of the total alkaline reserve of the body. The author prefers the method of Haldane which employs whole blood to that of Van Slyke which uses only the plasma. Methods combining blood and alveolar air examination are surely more accurate or informative. Another method whose value is still to be determined is to estimate the output in the urine of acid salts, salts of ammonia and free acid for when foreign acid is added to the body a corresponding amount must be eliminated by the lungs and kidneys.

In the opinion of the author 'the best test of acidosis at present available in routine clinical work' is to determine "how much alkali can be added to the organism without causing the urine to assume an alkaline reaction". Normally this is very small about 5 gm  $\text{NaHCO}_3$  but in acidosis may be as high as 100 gm a day. The value of this test seems to be established by experimental work. It is easy of application under all conditions and should be extensively employed in practice. Comprehension of the principles set forth and an appreciation of the relative value of the methods discussed, will serve to eliminate much loose talk concerning acidosis. It is to be hoped that the paper will be widely and carefully read for only in this way can its value be fully realized.

—*Medical Record*

### Surgical Value of Certain Abdominal Reflexes

*Lancet* May 3rd 1919 Page 229—DAVID  
LIGAT, F.R.C.S.

THE writer emphasises the importance of a thorough investigation of the abdominal reflexes and suggests the following method of eliciting these. The patient lies on his back, with mouth slightly open and the arms by the sides.

1 The abdominal wall is pinched by grasping the skin and subcutaneous tissue firmly between the finger and thumb and drawing them away from the deeper layers of the abdominal wall. The first pinch should be applied to a point where a normal response is practically always met with, *eg*, the left hypochondriac region, and the facial expression carefully watched.

2 The various areas known to be associated with disease of particular organs are then tested.

3 Lastly the point of maximum intensity and spread of the hyperalgesia thus elicited is suggested. Spread usually occurs in a vertical direction.

The method separates the abdominal organs into two groups 1—Lateral Gall-bladder appendix Fallopian tube 2—Central Stomach duodenum small and great gut.

The positions of the hyperalgesic areas are as follows—

*The gastric and duodenal area*—This area has its maximum point midway between the umbilicus and the ensiform cartilage.

*The small gut area*—Maximum point at the junction of the upper and adjacent fourths of a line drawn from the umbilicus to the symphysis pubis.

*The large gut area*—Maximum point at junction of lowest and adjacent fourths of a line drawn from the symphysis pubis to the umbilicus.

*The gall-bladder area*—The maximum point lies on the horizontal joining the tips of the tenth ribs and just inside the vertical line erected from the middle of Poupart's ligament.

*Appendix area*—The maximum point here is at the junction of the inner and middle thirds of a line drawn from the anterior superior spine to the umbilicus.

*Fallopian tube area*—Maximum point at junction of lowest and adjacent fourths of a line drawn from the middle of Poupart's ligament to the umbilicus.

The writer emphasises the fact that if this method is properly employed there is no pressure on the abdominal wall. Pressure on the abdominal wall gives rise to pain by stimulating the subperitoneal plexus of nerves which have been rendered irritable by local peritonitis. Pain due to pressure on a hyperalgesic area on the other hand, is due to upsetting of the equilibrium of the viscero-sensory arc. The method described eliminates pain due to direct pressure.

If hyperalgesia corresponding to a particular organ is elicited one may conclude that that organ has been the seat of the primary infection.

The reflex arc is completed in the mucosa, as the experimental work of Kelling shows and not in the peritoneal coat of the viscus. Wingate Todd quotes Kelling as follows—

'The fact that each nerve which distributes branches to the abdominal wall also supplies twigs to the alimentary canal accounts for the hyperæsthesia and local contraction found in a part of the abdominal wall in diseases of the canal. It accounts, too, for the alimentary reflex, the relaxation of the abdominal wall

associated with distention of the alimentary canal. This is the reason for the tightness of one's clothes after a heavy meal. Owing to this reflex a dog can double its abdominal contents at a meal without inconvenience. That the arc is completed in the alimentary mucosa, and not in the peritoneum, is shown by the fact that the reflex is not called forth by the injection of air or saline solution into the peritoneal cavity."

There are two fallacies which must be kept in view —

1 A diseased viscus may give rise to no reflex

2 Two distinct intra-abdominal lesions may co-exist, *i.e.*, a chronic appendix and a growth of the pelvic colon—and the appendix may well produce a reflex and the colonic growth none

### Action of Small Doses of Roentgen Rays

*Ugeskrift for Laeger, Copenhagen, November 27th, 1919* S1 No 48

EIKEN has been experimenting with Roentgen treatment in doses so small that the action of the rays seems to be restricted merely to a stimulating influence. Laboratory animals and fowls were treated in this way daily for months and then every third day up to a year, and none showed the slightest sign of injury therefrom. Their growth and procreation proceeded normally and their young procreated normally in turn. Similar experiments with animals inoculated with tuberculosis demonstrated that the reaction of the tissues to the tubercle bacilli occurred earlier and was more active than in the controls, the incipient foci healing. Applying these results to human beings, there seems a prospect of aiding the cure by this means in persons who display only a sluggish reaction, or the focus is located at a point where experience has always shown a torpid course. Without removing the clothing, the exposures were made for one minute from the front and from each side and for seven minutes from the back, and repeated every day or second day. The dose was 1/700 and 1/100 S N tablet. He gives the details of three cases of tuberculosis in which this treatment was applied. The stimulating action from it was unquestionable. The patients were 15 and 18 years old. In the superficial lesions the increased blood supply to the focus, the increased secretion and more pronounced demarcation were manifest, and then healing followed. One of the patients had tuberculous processes in lungs, cervical glands in skin and in the tibia, with several fistulas. A total of 100 exposures were made, and all the fistulas and external processes healed. The bacilli disappeared from the sputum for a long time, but scanty bacilli have appeared in the sputum again recently.

### Bladder Radiography.

*Presse Medicale, Paris, December 3rd, 1919*  
27 No 73

LIGURU AND PAPIN express surprise that the technic for pyclography has not been applied more systematically to the bladder. They have been using this cystoradiography, as they call it, since their publication on the subject in June, 1912, but found no reference to this method in the literature until Kelly's work in March, 1913. They have injected air, oxygen, bismuth, etc., but have found thorium sulphate or nitrate the best substances for the purpose. Thorium nitrate forms a solution which is not irritating or toxic, does not stain, and is less expensive than silver salts, etc. If a radiograph is taken of the bladder filled with fluid and then again after the bladder is emptied, any diverticulum shows up plainly, and this may explain the failure of persevering treatment, when cystoscopy has failed to reveal it. In one case two diverticula were thus revealed which had long maintained suppuration. Six instructive radiograms are given to show the different aspects of various lesions. A large tumor projecting into the contrast fluid renders the shadow within its outlines much lighter. In some cases the ureter mouth was gaping and the contrast fluid spread up through the congenitally dilated ureter, sometimes even into the pelvis.—*Jour A M A*

### Causation and Treatment of Rickets

*New York Medical Journal* December 6th,  
1919 No 23

"PRITCHARD holds the view which is that practically all varieties of malnutrition occurring during infancy and early childhood tend to terminate in rickets, provided they are sufficiently severe or long enough continued. They should not, however, be regarded as evidence of rickets, unless they are actually accompanied by the typical changes in bone which are characteristic of the disease. The essential and central feature of rickets he believes is the want of calcification or mineralization of developing bone, and this in its turn is due to existence of requirements for calcium which for the time being are more urgent than of developing bone. These urgent requirements are the necessity for neutralizing acid bodies in the blood, in other words, to neutralize or compensate an existing acidosis. In Pritchard's opinion, all chronic conditions of malnutrition of whatever kind or from whatsoever cause finally terminate in an acidosis and that all claims on alkaline bases arising in connection with the neutralization of this acidosis must be satisfied before those of developing bone are attended to. It is in the satisfaction of these claims for alkaline bases that the injury is done to growing bone"—*Jour A M A*

### The Treatment of Thyrotoxicosis by means of Roentgen Ray

*The Journal of the American Medical Association*  
November 20th, 1919—HORMIS and  
MURPHY

The writers' paper is based on the results obtained in 262 cases treated during the last five years in the Roentgen Ray Department of the Massachusetts General Hospital.

Reviewing the literature on the subject the writers refer to Dr. Clarence Stoner's series of 48 cases, 14 of which were completely cured and of which 22 derived great benefit. Pihler and Zulich after a careful review of the literature and a study of their own cases come to the following conclusions:—

1. We believe that the trial of treatment for one series with an interval of waiting of one month is justifiable in all cases for it operation is decided on nothing else and many operations can in this way be avoided.

2. Treatment should be directed toward the thyroid and the thymus glands.

3. Increase in weight and decrease in pulse are the first signs of improvement and are practically always found.

4. Treatment must not be prolonged over too long a period or hypothyroidism may be produced.

5. The goiter and the exophthalmos are the last to show improvement and in many cases show no change.

Morris and Aub in the *Journal of the American Medical Association* of July 7th, 1917, give their conclusions as follows:—

1. The general metabolism shows a characteristic increase in hyperthyroidism.

2. This rise may be used as a functional test of the thyroid activity or as an index of the intensity of the thyroid in oxidation.

3. An extended study of the metabolism in various types of toxic goiter shows that:—

(a) Rest alone usually causes a marked decrease in toxicity.

(b) Drugs in addition to rest do not materially accelerate this decrease.

(c) The Roentgen ray, in some cases, produces a definite improvement while in others it seems to be quite without effect.

(d) The usual immediate effect of surgery is a marked decrease in toxicity, but there is a very definite tendency toward a subsequent recurrence.

4. The lesson in therapeutics to be drawn from these results we believe to be about as follows:—

(a) Complete rest in bed plus irradiation should be continued until the metabolism reaches a level.

(b) If rest and the Roentgen ray fail to restore the metabolism to within 20 per cent of the normal it is proper to resort to surgery, unless there is some definite contra-indication. Among contra-indications a rising metabolism,

in spite of complete rest, seems to be very important.

(c) Following operation, if the metabolism again increases further active treatment should be carried out. The observations in the cases that we have followed for a long time emphasize the importance of keeping cases of exophthalmic goiter under observation for months rather than weeks, and preferably years rather than months.

The present writers used Coolidge tubes run from an interrupterless machine. The parallel spark gap was approximately 8 inches and the rays were filtered through 4 mm of aluminium and 1 mm of leather. The target skin distance was 8 inches. Three areas were treated each sitting and two-thirds of an erythema dose was given to each area. Both thymus and thyroid regions should be treated. They recommend an interval of three months after each series of three treatments given at three weeks' interval.

The conclusions arrived at are as follows:—

1. It is possible to decrease the activity of the thyroid gland and probably to destroy its glandular structure by exposure to the Roentgen ray.

2. Roentgen ray treatment when applied in cases of thyrotoxicosis produces a relief of symptoms and shortens the course of the disease.

3. A study of the basal metabolism before, during and after treatment is of the greatest importance both as a means of diagnosis and as check on the amount of treatment to be given.

4. The Roentgen ray, accompanied by rest, should be tried in all cases of thyrotoxicosis and should be continued for a sufficient length of time to destroy at least the thymus before resorting to surgery.

### The Schick Reaction

#### A VALUABLE AID TO DIPHTHERIA CONTROL?

IN spite of the remarkable and successful results which have followed the widespread use of diphtheria antitoxin, there is in this country a curious reluctance to adopt certain measures in control of the disease, which have already been extensively employed in other lands, notably in America. For this reason, a paper recently published in the *Lancet* by Dr. H. Mason Leete should receive all the attention it deserves. This author describes, and discusses primarily the Schick reaction for the determination of individual susceptibility to diphtheria and although he does not make any point which is essentially new to the literature on the subject, yet his clearly arranged words may well serve to light the flame of enthusiasm which is at present wanting. Many similar laboratory-controlled procedures have been handicapped by non-availability for general and institutional purposes of the required biological products but this cannot in this instance be the explanation since we can affirm that at least one large producing company is prepared to supply them in graduated and considerable quantities and is anxious to bring before both the medical profession and the local health authorities the possibilities of the method.

Admitting that most cutaneous reactions are far from infallible and that this one must be recommended with certain reserve as mentioned later, yet in view of the prevailing lack of precise knowledge on the subject, we find excuse for outlining the essentials of the Schick test as actually employed. Many articles, statistics, and temporary conclusions are found in the current medical journals of the U S A, but in that country the observational work is already so far advanced that they are not always easy for the uninitiated to follow.

To begin then at the beginning, the Schick test is carried out by injecting a very small dose of diphtheria toxin into the skin. This injection should be *intra-cutaneous* and of accurate quantity, which is in practice about one-fiftieth of a minimal lethal dose. The best site is the flexor aspect of the forearm, just below the fold of the elbow, and a round white wheal about the size of a large split pea should be formed. We may quote from Dr Leete's own experience as to the typical positive reaction, but for variations, discrepancies, and difficulties we must refer the reader back to the author's article. "A typical positive reaction begins to show distinctly in from 24 to 48 hours, and reaches its height about the third day. It is a sharply circumscribed area of redness, with definite, though slight, infiltration, circular or somewhat oval in shape, and varying from half to one inch in diameter. This persists for about a week, and on fading leaves a brownish pigmented area which shows traces of desquamation. A negative reaction is shown by the absence of redness and infiltration, after 24 to 48 hours nothing can be seen, except a point of redness marking the needle track."

It is beyond the scope of this note even to outline the many experiments by which either the American physicians or Dr Leete have arrived at their favourable conclusions, but after perusal of both, we feel justified in stating that the balance of evidence suggests the test to be of very definite value in detecting diphtheria susceptibles, and has, accordingly, many applications. Certainly it is very easy to perform and apparently free from any danger. Also, it would, although dependent upon the presence of corresponding anti-bodies in the blood, appear to be much more reliable than the known tuberculin reactions. If general experience runs parallel with that of Dr Leete in finding an error of not more than 1 to 2 per cent, then its value is amply confirmed, but here it must be noted that a large portion of the evidence is obtained from people passively immunised with diphtheria anti-toxin.

What we must with relative certainty know is whether the Schick test can be relied upon to the same extent to indicate the presence, or absence, of natural antitoxin and a consequent natural immunity. Dr Leete's later experiences, and to a greater extent the American statistics, go a considerable distance towards proving that the wider application is justified, and, if so, the possible benefits which may result are manifold.

Diphtheria as a disease works its most deadly and most frequent ill upon young children, particularly upon those recently suffering from catarrhal and inflammatory conditions of the mucous membranes of nose and throat. Typically we see this in scarlet fever and measles convalescents. To be able to detect at least those children which are the more susceptible to such secondary diphtheric infection would be valuable for the patients and attendants alike, and opens up the possibility of guided production of protective passive immunity.

So much for the outlook in hospital and institutional practice and the question arises as to how far the same process can be applied to the general public. Except for that section which comes under the direct control of the local health authorities although the indications would be identical, the practice of turning them to advantage would not be so easy. Through the agency of the school medical service the second most valuable possibility arises and in this connection

it must be pointed out that for some time past the New York Board of Health has, when possible, applied the test to school children, with results known to be most favourable.

Therefore would we urge that more practical and experimental attention be given in this country to the Schick reaction, since, valuable though limited local observations are, it is only by extended trial over a considerable section of population that a satisfactory conclusion can be drawn. Possibly the subject might with advantage be taken up by the Medical Research Committee—*The Hospital*.

### Is Vitamine Identical with Secretine?

[Also in Dutch]—*Meded Genesesk Lab de Weltevreden* 1918 3rd Ser A No 1 & 2 pp 99-104—B C J JANSEN

THE author states how desirable it is to be able to determine definitely, quickly and quantitatively whether a substance or preparation contains vitamine or not. He mentions the methods that have been employed, such as observing the curative results on birds which have been experimentally affected with polyneuritis, the amino-acid-nitrogen increased output on a vitamine poor diet, the amount of degeneration of nerves dependent on deficiency of vitamins in the diet, etc., all of which methods are unsatisfactory. Bredt and others have asserted that secretine and vitamine are identical, if this is the case, "the amount of pancreatic juice which is secreted in a given time after injection of the substance to be examined might be an indicator of the quantity of vitamine contained in that substance. For we know from the experiments of Bayliss and Starling that injections of secretine do cause such an increase. Dogs were used for the experiments, these were narcotised with morphia, a duodenal fistulous opening was made and a cannula passed into the pancreatic duct. Secretine was injected into the jugular and, after its stimulating action had ceased, a filtered extract of rice bran vitamins was injected and in one experiment a final injection of a further amount of secretine. These experiments showed that the effects of secretine were different from those of vitamine, therefore the two substances are not the same. The former stimulating pancreatic secretion, the latter not doing so.

The author also demonstrated that intravenous injections of a watery solution of a filtered bran extract caused almost immediate death of animals, this poisonous action is due to the contained potassium salts, and therefore if it should be decided to inject vitamine solutions intravenously for curative purposes, these should be deprived of their potassium salts—*Tropical Diseases Bulletin*.

### Report on the Anti-Beriberi Vitamine Content of Three Kinds of Atta Biscuits.

*Indian Jl Med Res* 1918 July Vol 6 No 1 pp 56-57 With 6 figs and 1 chart  
—E D W GREIG and DAGMAR F CURJEL

THE experimental results with pigeons, which were treated with three kinds of atta biscuits, are given in full. The three samples contained respectively 5 per cent, 10 per cent and 15 per cent of wheat grain embryo. Preventive experiments showed that the 15 per cent biscuit was very rich in anti-beriberi vitamine, as nine grammes on alternate days with polished rice fully protected the bird. Thirty grammes of 10 per cent was equally successful, but 15 grammes was insufficient. Sixty grammes of 5 per cent atta biscuit given in the same way was unable to protect, therefore the 5 per cent biscuit is much less efficient than the 15 per cent biscuit as regards protective powers against beriberi.



Food which had developed evidences of polyneuritis was quickly cured by about 10 grammes of the 15 per cent. bread. It was therefore evident that the 15 per cent. bread contained a high proportion of antiberberi vitamin and could be recommended for the use of the troops and be issued as an emergency ration. — *Tropical Diseases Bulletin*

### Report on the Anti-Beriberi Vitamine Content of Ground-Nut Meal Biscuits

*Indian Med. Rec.* 1918 Oct Vol 6 No 2 pp 143-146 — D W GIBB

THE experiments with the ground nut meal were similar to the experiments with the biscuits reported above. The results showed that the ground nut meal biscuits contained an anti-beriberi vitamin as the 15 per cent. bread. Therefore the ground nut meal whether in the form of bread or biscuit would be suitable for a part of an emergency or other ration for issue to the troops. — *Tropical Diseases Bulletin*

### i An Unclassified Form of Long Continued Pyrexia in Mesopotamia (Disseminated Nocardiosis)

*Indian Med. Gaz.* 1918 Sept Vol 53 No 9 pp 321-325 With 3 charts — C A SPRAYSON Preliminary Reports with a Pathological Description by F P MACKIE

### ii An Unclassified Form of Long Continued Pyrexia in Mesopotamia (Disseminated Nocardiosis)

*Ibid* 1919 Jan Vol 54 No 1 pp 35-36 — F P MACKIE

THE cases of an irregular prolonged fever are reported from hospitals in Mesopotamia. These resembled kala azar in that there were periods of prolonged fever with apyretic intervals, a large spleen, slightly enlarged liver, pigmentation of the skin, leucopenia with relative decrease of polymuclear cells, but in no case could Leishman bodies be demonstrated during life or post mortem. The cases in addition all showed pleuritic or pulmonary signs especially at the base of the right lung. The ten cases included four British soldiers and six Indians with one death among the former, most of the others being sent to base hospitals where their further course will be followed up. Clinically the cases had to be differentiated from kala azar, tuberculosis and malaria. In one case only tubercle bacilli were found but investigation did not support any of these diagnoses, the true character being in doubt as laboratory methods failed to substantiate any known disease. Mackie however by staining the tissues obtained from the fatal case by Gram's method, was able to demonstrate in the lungs and adrenals a considerable amount of delicate mycelium not associated as in actinomycosis cases with small celled infiltration.

The spleen also showed quantities of pigment granules quite unlike those of malaria which he considered to be conidia granules due to a disseminated fungus infection. From other cases of a similar nature examined since at Baghdad he has actually cultivated a fungus of streptothrix character. The fungus resembles in morphological and cultural characters the *Discomyces asteroides* of Eppinger (1890). The disease may therefore, be described as a disseminated nocardiosis.

These observations are of extreme interest and no doubt further investigation will bring to light other cases of this curious condition, which is probably infective.

Further investigation has shown that the suggested diagnosis of certain cases of long continued

fever somewhat resembling kala azar, as possibly a form of "disseminated nocardiosis" was probably not correct. The fungus-like tuft which was found being the result of outside contamination. One of the most typical cases was proved after death to be kala azar although two ante-mortem punctures had been negative. If the long continued fever cases described by Col Sprayson are a separate entity, their causative organism has yet to be found. — *Tropical Diseases Bulletin*

### The Relative Content of Antiscorbutic Principle in Limes and Lemons together with Some New Facts and Some Old Observations concerning the Value of "Lime Juice" in the Prevention of Scurvy

*Lancet* 1918 Nov 30 pp 735-738 — HARRITT CHICK, E MARGARET HUME RUTH F SHELTON and ALICE HENDERSON SMITH

THE contents of this interesting paper are sufficiently presented in the author's summary —

"1. The antiscorbutic value of the juice of fresh limes (*Citrus medica* var *acida*) has been compared experimentally with that of fresh lemons (*Citrus medica* var *limonum*) and has been found to be distinctly inferior. Volume for volume fresh lime juice possesses a potency of about one-fourth that of lemon juice. In one instance severe scurvy developing in a monkey on a diet containing a small daily ration (5 ccm) of fresh lime juice was cured by an equal ration of fresh lemon juice.

"2. Preserved lime juice was found useless for the prevention of scurvy by the method employed. Experiments with preserved lemon juice are still in progress but give promise of better results.

"3. The experimental results are fully confirmed by a historical study of 'lime juice' in connexion with human scurvy. At the period when scurvy was eliminated from the British Navy by its agency the term was used to express the juice of lemons and it was not until the second half of the nineteenth century that the juice of West Indian limes was adopted in the Navy and Mercantile Marine. The history of two Arctic expeditions that of the *Investigator* 1850, and that of the *Alert* and *Discovery* 1875 has been carefully investigated. The former supplied with lemon juice experienced remarkable immunity from scurvy during the first two years of great difficulty and privation, the latter, supplied with lime juice, suffered severely from scurvy at the end of the first winter spent in the Arctic regions.

"It should be noted in connexion with these facts that scurvy is a disease with a long period of development. As much as four to eight months upon a defective diet may elapse before definite symptoms of scurvy can be observed." — *Tropical Diseases Bulletin*

### Beer and Scurvy, Some Notes from History

*Lancet* 1918 Dec 14 pp 813-815 — ALICE HENDERSON SMITH

BEER has been used as an antiscorbutic since the voyages of Barentz in 1594-7, at first in the form of spruce beer, then as sweet-wort, made by pouring boiling water over malt and leaving to stand. In the middle of the last century when the Franklin Search ships left this country and the United States, the malt used in the preparation of beer or sweet-wort was "high-dried kilned malt" so that, as the author observes, "the essential element was removed without its importance being observed and the traditional belief now pertains to a beer from which the antiscorbutic value of the germinated malt has been removed unwittingly by the improvement of the malting processes." It has never been claimed that the use of beer is a complete protection against scurvy.



and lemon juice has removed the need of it. Reference is made to Captain H. Dyke's paper (see this *Bulletin* Vol 13, p 33)—*Tropical Diseases Bulletin*

### A Note on the Value of Germinated Beans in the Treatment of Scurvy, and Some Points in Prophylaxis.

*Lancet* 1918 Dec 14 pp 811-813—H W WILTSHIRE

SERBIAN soldiers, apparently at Salonika, were thus treated for scurvy in 1917, owing, however, to delay in procuring the beans only a few and slight cases were available. Haricot beans were soaked in water for 24 hours and placed in perforated tin trays for 48 hours to germinate, being kept moist with free circulation of air, afterwards 10 minutes boiling was sufficient to render them edible. In one ward each scurvy patient received 4 oz of fresh lemon juice daily, in another a portion of germinated beans which had weighed 4 oz in the dry state, other forms of treatment were the same—admission to the wards was alternate. Of 30 patients treated with lemon juice and 27 with beans, 53.4 per cent of the former were cured within 4 weeks, and 70.4 of the latter. In another series of 21 cases when under 4 weeks lemon juice treatment progress was slow it was accelerated by the substitution of germinated beans. A consideration of the Serbian ration shows that the meat supply, part frozen and part tinned, was devoid of antiscorbutic properties. The majority of the patients had received one or two issues of potatoes with rice weekly and one of onions, and 16 had received onions daily and spinach and potatoes twice a week. The development of scurvy on this diet can only be explained on the assumption that the antiscorbutic vitamins were destroyed in cooking. With respect to cooking, heat and altered chemical reaction are under suspicion and it is shown that in this case heat was probably responsible, so that vegetables should be boiled only to the absolute minimum required to make them digestible. It is considered that, if an addition of vitamin containing substance is needed, germinated pulses provide the easiest and cheapest form of this addition, especially when it is remembered that beans are food and lemons are not. If heat is insufficient for germination a hot-bed of horse manure, if available, will supply it. With regard to the fact that the prescurbutic period is 2-4 months, it is concluded that preventive measures in Europe should commence not later than November.—*Tropical Diseases Bulletin*

### Canned Tomatoes as an Antiscorbutic

*Proc Soc Experim Biol and Med* 1918 Oct 16 Vol 16 No 1 pp 1-2—ALFRED F HRSS and LESTER J UNGER

### Preliminary Observations on the Value of Raw and Dried Tomatoes as Antiscorbutic Foods for Guinea-pigs.

*Ib.d* pp 2-3—MAURICE H GIVENS and HARRY B MCCLUGAGE

SERIES of guinea-pigs were fed on diets of hay, oats and water with and without the addition of 5 cc. of canned tomatoes. These died of scurvy, those were protected, as is shown in a graph. Canned tomatoes have been given to babies in lieu of orange juice with good results.

The same effects were obtained with a different diet and 10 gm of raw tomatoes, used either preventively or curatively. Tomatoes dried under conditions described retain some of their antiscorbutic properties.—*Tropical Diseases Bulletin*

### Infantile Scurvy; The Antiscorbutic Factor of Lemon Juice in Treatment

*Lancet* 1919 Jan 4 pp 17-18—A HARDEN, SYLVESTIR S ZILVA and G F STILL

THIS paper merits a brief notice as the substance described will probably prove of value in adult scurvy. Harden and Zilva have shown that after the removal of free citric and other acids from lemon juice, the residue, which contains about 15 mgm of solids per cc retains antiscorbutic activity. Four cases of infantile scurvy are described in which the remedial effects were remarkable. The antiscorbutic is given in concentrated form and hence in much larger amount than could be taken in the form of lemon juice, the unessential and irritant part is eliminated. The results obtained in animals are thus confirmed.—*Tropical Diseases Bulletin*

### The Antiscorbutic Properties of Concentrated Fruit Juices

*Jl Roy Army Med Corps* 1919 Jan Vol 32 No 1 pp 48-56—A HARDEN and R ROBISON

As a result of experiments on guinea-pigs the authors reached the following conclusions—

"(1) The antiscorbutic principle in orange juice is not volatilized when the juice is distilled at 40 degrees C under reduced pressure

"(2) By evaporation of orange juice at 40 degrees C under reduced pressure it is possible to obtain a solid residue, which possesses the antiscorbutic value of the fresh juice in a very high degree. This value is not appreciably diminished when the substance is kept in a dry atmosphere at room temperature during six months"

Guinea-pig experiments by Robison on apple juice, concentrated by a method which entailed heating to 102 degrees C for less than one minute, showed that it possesses very valuable antiscorbutic properties though not in the same high degree as the dried orange juice"—*Tropical Diseases Bulletin*

### A Note on the Occurrence of Negri Bodies

*Indian Jl Med Res* 1918 Jan Vol 5 No 3 pp 478-480—J W CORNWALL

"It has been held that it would be possible to decide by a microscopical examination of the brain of a man, who had died from hydrophobia after undergoing a course of anti-rabic inoculations, whether death had been due to the street-virus originally introduced by the bite or to the fixed virus used in the treatment, death from street-virus would be denoted by the presence of large Negri bodies, from fixed-virus by the absence of Negri bodies, except perhaps a few minute dots. The experience of this laboratory is not in favour of the view that large Negri bodies are never found after death from fixed-virus infection so it is concluded that, neither the presence of Negri bodies in the brain of a man who has succumbed from hydrophobia nor their absence from it can be relied on to decide whether the bite or the remedy caused the fatal issue"—*Tropical Diseases Bulletin*

### Treatment of Cholera

### Que faire en cas d'épidémie de choléra? (Une médication causale du syndrome diarrhéique)

*Rev Méd Suisse Romande* 1918 Sept Vol 38 No 9 pp 555-569—VICTOR KUHNÉ

THE author's experience gained while in charge of a hospital at Nish after the peace of Bukarest (Balkan War) leads him to place the greatest reliance on Stumpf's bolus treatment, to the exclusion of all others, including hypertonic saline injections, which

he dismisses as merely symptomatic. He claims to have been able to reduce the mortality from 45 to 2 or 3 per cent. The method is to mix equal volumes of water and bolus alba (kaolin) *putting the latter into the former* (about 100 gm of kaolin to  $\frac{1}{2}$  litre of water) and allowing the patient to take a glassful cold every hour or half hour. It is rarely necessary to take more than 6 glasses (equal about 200 gm kaolin) in the first 12 hours. Generally the vomiting soon ceases, the pulse improves and the patient sleeps. During the second 12 hours and the following day one gives according to the patient's condition several glasses of the mixture then for a few days a light diet. If the case is treated in this way from the beginning cure results in 24 hours and the patient can leave the hospital in 3 days. Should the case be so bad that the stomach and intestines are tonic, the bolus mixture must be given by stomach pump, or if that is not possible, as an enema. It is important that during the 18 hours which follow the beginning of the treatment except for water, neither food nor drink should be given.

All forms of gastric disturbance whether due to cholera nostris or metallic poisons, etc., are benefited by this treatment which apparently relies upon the great absorbing power of the fine particles of aluminium silicate. An interesting history of the drug accompanies the paper—*Tropical Diseases Bulletin*.

### The Prophylaxis of Malaria

*Jl Roy Army Med Corps* 1918 July Oct  
Vol 31 Nos 1, 4 pp 60-75, 272-276—  
G T RAWNSLEY, R A CUNNINGHAM, and  
J WARNOCK

THE authors, considering the question from the army standpoint, allow some elasticity to the term prophylaxis and follow the logical course of including the cure of individual infection as an important part of rational communal prevention. This was aforesaid a paradox but now the times give it proof. Their conclusions, which though not novel have confirmative force, are that for the eradication of malaria the following are the chief points to be attended to: (a) the destruction of the mosquito throughout all stages of its existence, by draining and draining, by oiling or cresoling of pools by clearing of brushwood and undergrowth, by traps and by destruction of adults, particularly when hibernating, (b) the protection of men from mosquitoes by choosing proper sites by mosquito-proof buildings, nets, veils, gloves, and deterrent ointment (c) the cure of infected men, or their removal, (d) the maintenance of a high standard of general sanitation. This last point has great significance when one considers that it must have been chiefly as a result of improved sanitation and a general amelioration of the conditions of life that malaria silently died out in this country.

Individually "prophylactic" quinine *per se* the authors consider useless, mainly because in one year five-grain doses twice a week (usually on two consecutive days) did not preclude a high occurrence of malarial fever, nor in the next year did ten grains twice a week, or ten grains every other day, or ten grains four days a week, or ten grains every day. The case thus stated certainly looks bad, but the data are not sufficiently precise and comprehensive to justify such verdicts as "useless," "futile," "positively dangerous," against quinine taken with a view to prevent infection of a perfectly malaria-clean individual.

Quinine given to prevent relapses—what in the authors' scheme of prophylaxis might be termed communally-protective quinine—is also thought to be uncertain and disappointing, and here again the authors seem to take a desponding view which their own observations do not vindicate.

A company, 104 strong, of which nearly every man had had malaria (the worst infested company of a badly infected battalion), was in October-November

put on a four weeks' course (as far as possible) of quinine (gr 30 daily) and arsenic. While under treatment the men carried on their ordinary duties. During the month of treatment only 2 cases, and during the month following treatment not a single case, of malaria occurred in this company, whereas in the same eight weeks about 150 cases of malaria and undiagnosed fever occurred among the men (about 500 in number) of the rest of the battalion.

Again during the winter months the whole of an army corps was put piecemeal on a 24 days' course of quinine (30 gr daily) combined with arsenic, or with iron strychnine and arsenic. Altogether 38,433 men received the treatment, of whom 23,071 were actually known to have had malaria. During the term of treatment 424 relapses occurred, during the first month following treatment 1,695, and during the second month 2,750. Thus the total number of relapses within 2 months and 24 days (*circa*) was 4,869 equals 21.08 per cent of men actually known to have suffered from infection, and 12.66 per cent of the total strength (which very likely included other malarials besides the 23,071 identified as such). Furthermore the general opinion of medical officers was that by this treatment the general state of health had been vastly improved, many admissions to hospital avoided, and the treatment of hospital cases rendered more amenable. In the face of this experience it is a hard saying of the authors that "curative" quinine is "uncertain in its action and disappointing in its results," *quacunque* and *qualitrcunque*—*Tropical Diseases Bulletin*.

### The Clinical Rôle of the Fat Soluble Vitamine its Relation to Rickets

*The Journal of the American Medical Association*, January 24, 1920—Hess and UNGER

THE writers state that about a year and a half ago they undertook the study of rickets in about 100 infants cared for in a modern child-caring institution. The children under observation were placed on various diets—an abundance of fat soluble vitamine in the form of milk and cream, a deficiency of these substances as in skimmed milk, an abundance of water soluble vitamine as supplied by autolyzed yeast, or diets such as Mellin's Food. In all cases there was but one deficiency in the diet, which was adequate in quantity, that is to say in calorific content, and contained in every instance sufficient antiscorbutic foodstuff.

In their preliminary remarks the writers state that beading of the ribs, especially in conjunction with enlargement of the epiphyses, furnished the most reliable criterion of the course of the disease. They admit, however, that beading of the ribs may also be a feature of infantile scurvy and may even come about as the result of a lack of the water soluble vitamine. They also found that rickets can develop notwithstanding an abundance of fresh air and light. So much for the domestication theory of von Hansemann, and the respiratory poison theory of Kassowitz.

In order to study the influence of the fat soluble vitamine they placed a number of infants during the first months of their lives, on large amounts of milk, in some instances giving cream in addition. The dietary also included orange juice. In some cases a mild degree of

rickets was observed, but in others marked symptoms developed

The comment on their findings and their conclusions are as follows —

Our experience leads us to believe that except under exceptional circumstances—as in time of war—the danger to the infant and to the child from a deficiency of the fat soluble factor is one not to cause great apprehension. It is true that this principle is by no means so widely distributed in nature as the water-soluble vitamine, but, on the other hand, infants seem able to thrive for long periods on very limited quantities, provided the diet is otherwise complete. The great danger arises from diets composed merely of cereal and water or perhaps an insufficient amount of butter milk or skimmed milk. It is probably true that a catastrophe will result if the incomplete diet is maintained for years, or even sooner in a susceptible individual, as is well known to be the case in scurvy or in beri-beri. In formulating dietaries for infants and children therefore, this food factor should be borne in mind and be regarded as an essential constituent.

There is a growing danger of attributing every unexplained growth impulse to the new, attractive, but ill-defined vitamines—of their sharing with the secretions of the endocrine glands the fate of becoming the dumping-ground for every unidentified factor. It should be borne in mind that there are other little understood factors and food reactions. One of these is the peculiar and almost specific rôle that cereal plays in the nutrition of the infant. This phenomenon has been of especial interest to us for some time, and well illustrated the complexity of nutritional problems.

Not infrequently infants receiving diets which, according to accepted standards, should be adequate, fail to gain until cereal is given in addition. These babies usually are 6 months or more of age, and receive milk mixtures that should suffice to bring about growth. As the result of such experience, physicians add cereal to the milk diet when there is a failure to gain about the second half year of life. In order to obtain more precise information in regard to this interesting phenomenon, for which there is no satisfactory explanation, we studied a number of infants who had reached this stationary phase. It was found that in cases in which even cod liver oil no longer caused a gain, and in which egg yolk and beef drippings had failed, a small amount of wheat cereal (cream of wheat) brought about a decided increase (Chart 8). This result occurred whether the previous diet had been rich in fats, as just instanced, or contained a carbohydrate such as Mellin's Food (maltose and dextrin, Chart 8). In one instance, when large amounts of autolyzed yeast failed to stimulate growth, the wheat cereal was effective (Chart 8). Another, a breast-fed baby, aged 8 months, which had not gained for three weeks, increased 6 ounces as

soon as a small amount of cereal was given in addition to the nursings. These gains could not be due to an addition of any of the recognized vitamines, as diets rich in the antiscorbutic, water-soluble and fat-soluble factors were nevertheless enhanced in value by the cereal addition. Nor could it be the result of a simple caloric increase in food, for the amount added was comparatively insignificant. Cooked cereal equivalent to only 2 or 3 gm of the dry cereal frequently led to a gain of 2 or 3 ounces by the following day. These babies were receiving a high caloric diet. In one instance a quart of protein milk and 30 c.c. of cod liver oil were given, representing about 120 calories per kilogram of body weight (Chart 8). The simplest and most direct explanation of this reaction is that this carbohydrate brings about a more complete oxidation and thereby a better utilization of the food. However this may be, it illustrates the point that not everything which induces growth—and which does not conform to accepted standards—is a vitamine.

#### CONCLUSIONS

It would lead too far afield to discuss the various theories that have been advanced to account for the occurrence of rickets, and, moreover, it would not be profitable at the present time, as the data are inadequate. There seem to be several causes at work, rendering the untravelling of the problem so difficult that there is a difference of opinion not only as to the particular dietary factor that is at fault, but even as to whether rickets is to be considered a disorder of dietetic origin. It should not be lost sight of that there is a prenatal factor involved. The fact that the Negro infant, living side by side with the white in the larger cities and obtaining a milk from the same source, develops rickets so frequently and so markedly, indicates that there are important influences to be reckoned with in addition to the food.

In considering the diet a most important question is whether the recent theory as to the vitamine origin of this disorder can be maintained and, more particularly, whether rickets should be attributed to a lack of the fat-soluble factor. We can obtain the clearest understanding of this aspect by comparing this disease to the well recognized and established deficiency diseases scurvy and beri-beri. What does the comparison show? In the first place, these two disorders are commonly accompanied by weakness and malnutrition, we do not encounter the strong, apparently healthy babies met in rickets. But of far greater moment is the fact that neither can be brought about by over-feeding. Rickets, as emphasized in the body of this paper, frequently develops in infants receiving too much milk rich in fat, protein and salts. It seems impossible to bring this fact into consonance with a deficiency disease, whatever may be its nature, using this term in the commonly accepted sense. Our

study shows that the fat-soluble vitamin is not the controlling influence, that infants develop rickets while receiving a full amount of this principle and that they do not manifest signs, although deprived of this vitamin, for many months at the most vulnerable period of their life. It is impossible to interpret the contrary conclusion which Mellinby came to as the result of his pioneer experiments on dogs or to accept the term "fat soluble vitamin" as synonymous with "antirachitic factor" as Hopkins and Chick would have us do. Clinical tests carried out with care must be recorded fully as much weight as laboratory investigations. The two methods of approach should be carried out side by side and even the most thorough study on animals must be made to harmonize before it can be accepted as holding good for man.

Finally this work seems to show that the danger to infants of a diet deficient in fat-soluble vitamin is slight provided it includes sufficient calories and otherwise is complete. They can maintain their health and vigor despite amounts of fat-soluble vitamin so small as rarely to be encountered in times of peace. In spite of the fact therefore that this vitamin is not widely distributed in nature a disorder that may be termed "fat soluble deficiency"—marasmus or xerophthalmia—is hardly to be apprehended from a clinical standpoint.

### Aortitis Syphilitica

*Journal of the American Medical Association*  
January, 1920—C. F. HOOVER, M.D.

THE writer criticises an editorial in a recent number of the *Journal*. He expresses surprise at the statement that "It seems highly probable that in the aorta as in the central nervous system, definite lesions may be present without any symptoms whatever and it would seem that some method of diagnosing syphilitic aortitis during the pre-symptomatic period must be devised." The diagnostic signs of aortitis, he writes, were clearly described long before the Roentgen ray or the Wassermann reaction or the spirochæte was known to the medical profession.

Among the physical signs which are characteristic of this disease are first of all those due to *elongation* and *dilatation* of the aortic arch. These are visible aortic pulsation, and aortic dulness to the right of the sternum. By the time visible aortic pulsation to the right of the sternum is visible, the disease has so far advanced that it offers no difficulty in diagnosis and little hope from therapy. Slight degrees of enlargement which can be detected by percussion are of the greatest importance. Dulness in the second intercostal space on the right side compared with the left can best be detected by direct percussion with the extended finger and is an important sign of elongation and dilatation of the aorta.

*Systolic pulsation of the arch of the aorta*—This sign can be detected by bimanual palpation.

The examiner places his right hand over the second interspace at the right of the sternum, and his left in the interscapular space at the left of the vertebral column. By this means the muscular sense of the thoraco-scapular muscles is employed. An increase in the pulsatory expansion of the aorta can also be detected by placing the ear in contact with the second interspace to the right of the sternum.

*Accentuation of the second sound of the heart affords further evidence*—This phenomenon does not depend on increased intra-aortic pressure, but rather on increased accessibility of the arch due to its proximity to the anterior thoracic wall, on account of the elongation. For the same reason we get accentuation of the second sound when the aorta is pulled to the right by retraction of the upper lobe of the right lung as in fibroid phthisis.

*Palpability of the diastolic impact*—A palpable diastolic impact is also due to increased accessibility of the arch and may be detected by palpating with the palm of the hand at the level of the ends of the metacarpal bones.

*Loss of elasticity*—There is no physical sign ascribable to a loss of elasticity of the arch unless the root of the aorta is also involved. Then the diastolic sound takes on a tympanic quality.

*Murmurs*—Systolic murmurs over the second right interspace depend on the production of eddies in the blood stream due to the passage of fluid from a vessel of smaller to one of larger lumen. Stenosis at the orifice and dilatation beyond supply these conditions. The loudness of the sound depends on the abruptness of the change.

*Syphilitic mediastinitis*—This is a common accompaniment of syphilitic disease of the aortic wall. Substernal pain, inclusive of the laryngeal nerve, paroxysmal tachypnoea, and pain on swallowing have all been observed. The only direct physical sign is a friction sound heard at the second interspace to the right of the sternum.

The writer concludes that the Wassermann reaction, *Spirochæta pallida* and the Roentgen ray have all served to confirm and illuminate the work of the great clinicians Fournier and Huchard to whom early recognition of this disease was due, when the only means at our disposal was physical examination.

### Intravenous Injections of Hypertonic Glucose Soluble in Influenzal Pneumonia

*Journal of the American Medical Association*,  
January 10th, 1920—WELLS and BLANKINSHIP

THE writers refer to the apparent helplessness of the profession in the treatment of the chief complication of influenza, *viz.*, pneumonia. Seeing that glucose intravenously and otherwise had been used with success in serious diseases it occurred to them to test its efficiency in this fatal complication of influenza.

The strengths of the solutions used were 5, 10, 15 and 25 per cent. The usual intravenous technique was employed, 250 to 300 c.c. of the solution being injected in thirty to forty minutes (60 to 90 drops per minute).

In all 319 patients were treated. These were divided into three groups. Group 1 comprised those cases who were seriously ill, but who were expected to do well under the usual methods of treatment. Group 2 included those who were dangerously ill, but who had a fighting chance of recovery. Group 3 included all the hopeless cases. The mortality rates for each group were: Group 1, \*, Group 2, 645, and Group 3, 6506.

The mechanism by which glucose solution aids in recovery is considered by the writers to be two-fold. In the first place there is an influence on dehydration. There is at first a withdrawal of fluids from the tissues, as shown by a fall in the hæmoglobin content of the blood and a normal sugar concentration shortly after injection. This is necessary to maintain an isotonic condition of the blood. There is no withdrawal of sugar from the blood by the kidneys, for in the writers' cases glycosuria was uniformly absent. Secondly, glucose being a food is used up by the starving tissues. Associated with this is stimulation of cell activity as pointed out by Lusk and possibly direct stimulation of the cardiac muscle.

The writers summarise their conclusions as follows —

"1 The intravenous injection of glucose solution is a valuable aid in the treatment of serious cases of pneumonia.

"2 The results following are almost immediate, but are not necessarily lasting, and success may follow only after repeated injections.

"3 The injection of glucose solution is not more difficult than the injections of other intravenous medication.

"4 It is not intended that glucose solution should be substituted for anti-pneumococcic serum in cases of type 1 infections, it may, however, be added to the serum treatment."

NOTE.—Glucose belongs to Heidenham's second class of lymphagogues and was considered by this author to act as a stimulant to the endothelial cells lining the capillaries. Starting, however, showed that the increased flow of lymph is due to a condition of hydræmic plethora caused by attraction of fluid from the lymph spaces causing increased capillary pressure, and increased filtration of fluid from the blood vessels. It is impossible that this increased flow of lymph with its resultant washing out of toxins from the tissues may account for part of the improvement.

### **Treatment of Goitre with Injections of Phenol, Tincture of Iodine and Glycerine.**

*Journal of the American Medical Association*,  
January 10, 1920—J. E. SHIEHAN, M.D., and  
W. H. NEWCOMB, M.D.

This article is a report on the results of injections into the thyroid gland of equal parts

of phenol (carbolic acid), tincture of iodine and glycerine, in 80 cases of goitre.

**Method**—Twelve minims of a mixture of equal parts of tincture of iodine, phenol and glycerine are injected into the most prominent part of the gland. The needle is plunged directly into the gland and the patient instructed to swallow. If the needle is in the gland it will show a marked excursion during the act. If outside the gland no such movement will take place. The injection should be made very slowly to avoid severe pain. There is always some pain, but it soon subsides. The usual interval between injections is five days. The number of injections required is from five to twenty-six.

**Mode of action**—The rationale of the treatment is to cause localised inflammation of the gland with a resultant fibrosis. It quiets the heart's action, improves the appetite, has a favourable effect on metabolism, stays emaciation, and reduces the mental irritability. After the case has favourably reacted to treatment one is able to feel islands of fibrosis just as in hob-nail liver.

It has been the writer's custom to inject all cases for operation. The patients are kept in bed, but may be allowed up for a few hours daily. Light non-animal diet, codéin in small doses and colonic irrigations are also ordered. The result of this regime is relief of toxic symptoms and a better chance of operative success. The most suitable type of case for this treatment is the parenchymatous goitre of young women. It is also useful in exophthalmic goitre but is of no avail in the cystic or colloid form.

The writer's conclusions are as follows —

1 A goodly percentage of parenchymatous goitre will be cured by this method.

2 It relieves the thyrotoxicosis in the graver forms.

3 It is of no use in the cystic and colloid forms, and never should be given.

4 It is a safe procedure if one's technique is not faulty.

5 It is given as a preliminary in all cases going to operation, with the exception of the cystic, colloid and cancerous forms.

6 It is the only hope of relief in the inoperable cases and those in which surgery is refused.

### **High Protein Diets and Nephritis**

*Journal of the American Medical Association*,  
January 10, 1920

COMMENTING on the connection between High Protein Diets and Nephritis, the Editor, *Journal of the American Medical Association*, writes —

"The science of pathology is still far from formulating an entirely satisfactory hypothesis for the genesis of all forms of nephritis. It is known, of course, that incident to the attempts

of the kidney to eliminate certain substances like the salts of mercury or uranium or several other metals, a tubular nephritis of varying intensity may arise, and the acute injury may subsequently become chronic in its manifestations. There is considerable justification for the belief that the reaction of the secreted urine, which in turn is dependent on the nature of the food intake is not without influence on the behaviour of the kidney cells under secretory stress. Usually, however, the etiology of nephritic changes is sought in some foreign factor, such as the inorganic possibilities just cited or nephrotoxins or nephrolysis assumed to arise within the organism itself.

"Although the alleged 'strain' of eliminating a large quantity of those substances, namely, the products of protein catabolism in the body which the kidney is normally intended to excrete, has been pointed to from time to time as a possible cause of the kidney damage there has been little convincing evidence for such an outcome. Urea, which represents the great bulk of the nitrogenous waste, is evidently excreted with great ease. There are numerous recorded instances of large increments in urea output without any signs of kidney defect or detriment, but experiments to determine the functional efficiency of the kidney have usually been of comparatively short duration. The clinical forms of nephritis are frequently slow in making their appearance. Newburgh has therefore attempted, in the department of internal medicine at the University of Michigan, to ascertain whether nephritis will be produced when the kidneys have been eliminating an unusually large amount of nitrogenous material over a considerable period of time. He argues that just as the kidney secretes ordinary medicinal doses of mercury without harm but is injured when the quantity offered for elimination in a given time is augmented greatly, as it is in acute poisoning, so the renal cells may react unfavourably if the quantity of some or all of the nitrogenous substances secreted is increased and kept at the higher level for some time. In feeding experiments on rabbits, renal injury was quickly and constantly noted in animals that ate several egg whites daily. Prolonged egg white feeding caused acute and sub-acute nephritis. When the nitrogenous metabolism was increased by means of casein, rabbits suffered no demonstrable renal injury from eating 15 gm of casein daily, but when the daily intake of casein was 30 gm, and the nitrogen metabolism was about three times normal, a well marked deleterious effect on the kidney was produced. Rabbits that lived for months on soy beans, which are rich in vegetable proteins, regularly acquired chronic nephritis and frequently died of it. The nitrogen metabolism from this diet was about twice the normal.

"We may accept these observations, which are likely to be widely quoted by the advocates of a low protein diet or at least of greater economy

in the use of protein, without admitting their wider significance in the etiology of human nephritis. The vegetarians will find little solace in the fact that sources of plant proteins were involved as well as the tabued animal products. Urea *per se* is not charged with the harm done. It must be remembered that the diets used by Newburgh were potentially acid in character, and certain to produce an acid urine in a species adjusted and accustomed to secrete an alkaline fluid under a free choice of food. Until such experiments are successfully duplicated under conditions in which the normal reaction of the renal secretion is not tremendously altered and the accessory factors in the diet are known to be adequate, the incrimination of the high protein diets in connection with nephritis must be considered with judicial reserve."

### Lung-Irritant Gas Poisoning and its Sequelæ.

*Journal of the Royal Army Medical Corps*, Dec., 1919—J. S. HALDANE, M.D., F.R.S.

IN a lecture delivered at the Royal Army Medical College on October 8, 1919, Professor Haldane described some of his experiences and researches on the effects of the poisonous gases used by the Germans during the World War.

Dr Haldane states that the first cases he saw were produced by chlorine in a concentration of 1 in 10,000. The bad cases were panting, deeply cyanosed, with plum coloured lips, distended veins and more or less stupefied. These were the so-called "plum coloured" cases. Post mortem the lungs were voluminous and much congested. Albuminous fluid could be squeezed from them in abundance. The bronchi and alveoli were much inflamed and a great deal of emphysema was present.

A second group of cases due to phosgene and other lung irritants was met with later. In this group—the "gray" cases—the initial symptoms were sometimes delayed, the superficial veins were not distended and the lips and face were of a grayish colour.

With regard to the pathology of the first type, Dr Haldane takes us back to the physiology of breathing. He pointed out that during normal breathing the oxygen in the lung alveoli comes into diffusion equilibrium with the blood. The hæmoglobin in the arterial blood leaving the lungs is almost saturated with oxygen. To reach the blood the oxygen has to pass through the alveolar epithelium and capillary wall. In health while at rest, there is sufficient time (1 second) for diffusion equilibrium to be attained. During the muscular exertion the process may not be complete, hence the panting, cyanosis, etc., sometimes observed.

In "gassed" cases, owing to swelling, exudation, and paralysis of secretion by the alveolar epithelium (Dr Haldane believes that active secretion of oxygen inwards does take place in



cases of definite oxygen want), the oxygen cannot get through to the blood quickly enough to saturate the hæmoglobin to the normal extent.

In a similar manner the carbon dioxide is unable to leave the blood. As a result we get anoxæmia with an excess of carbon dioxide in the blood. The symptoms due to anoxæmia, *viz.*, cyanosis and clouding of intelligence disappear on administration of oxygen, but the hyperpnœa which depends on excess of carbon dioxide remains.

It is evident from the frequency and fulness of the pulse, and distension of the capillaries, that the circulation is greatly increased.

To explain these phenomena Dr Haldane points out that the circulation is regulated not primarily by the action of the heart itself, but by the rate at which the tissues allow the blood to return to the heart. Krogh has recently shown that the capillaries do not simply respond passively to blood pressure, but actively contract and dilate. In the plum coloured cases the dilatation is due to diminished saturation with oxygen and increased saturation with carbon dioxide. The direct result of this capillary dilatation is an increased delivery of blood to the heart.

The fulness of the surface veins can be explained by failure of the heart to respond to the increased work thrown on it, because no organ can work properly without an adequate supply of oxygen.

How can we avert these dangers? There are two means of doing so. Firstly, by bleeding. This procedure relieves the right heart, the venous distension disappears, and the tendency to œdema of the lungs is diminished. Secondly, by administering oxygen to relieve the anoxæmia.

In the second type of poisoning due to phosgene and its congeners, there is little bronchitis and emphysema, consequently the symptoms resemble those of the uncomplicated anoxæmia of high altitudes. There is but slight hyperpnœa, but, such as there is, tends to cause alkalosis owing to increased elimination of carbon dioxide (an acid). The increase in alkali is got rid of by the kidneys and the urine may become alkaline in reaction. This condition should not be confounded with acidosis, as demonstrated by certain new tests.

Another complication here arises and this depends on the dissociation curve of oxyhæmoglobin. The less carbon dioxide in the blood the greater the affinity of hæmoglobin for oxygen, so that while it takes up this gas more readily it will part with it less readily to the tissues. Hence anoxæmia with cyanosis ("plum coloured" cases) is less dangerous than anoxæmia without cyanosis ("gray" cases).

The effects of anoxæmia are first of all nausea, headache, and general depression with more or less complete loss of memory. If a severe anoxæmia lasts for a long time the

damage to the central nervous system is such that recovery may never take place, although, as in carbon monoxide poisoning, the anoxæmia has been completely removed. The greatest danger lies in failure of the respiratory centre as evidenced by increased shallowness of the breathing and the leaden-gray colour of the lips. The main effect of anoxæmia on the heart is to diminish its capacity for work, so that anæmia of the brain, as shown by dizziness, faintness and collapse, may be caused by slight exertion. The immediate danger, however, is from the respiratory centre and the treatment is administration of oxygen. Bleeding would be useless or harmful.

On the subject of oxygen administration Dr Haldane has something very definite to say. Pure oxygen, he points out, has been shown by Lorrain Smith to have a slow irritant action on the lungs. Only a moderate percentage, therefore, should be added to the inspired air. An inhalation apparatus constructed by Messrs Siebe Gorman and Co for the Army Medical Service includes an arrangement by which oxygen is delivered only during inspiration, a reducing valve and tap to regulate the supply, and a gauge to show how long the oxygen will last.

Dr Haldane next deals with one of the most prominent sequelæ of irritant gas poisoning, *viz.*, dyspnœa on exertion. This symptom was relieved to some extent by breathing air enriched by oxygen. But increased frequency of respirations and an increased pulse rate remained in spite of treatment. This is due to excessive action of the Hering-Breuer reflex. It was shown many years ago by Hering and Breuer that distension of the lungs liberates a nervous impulse which passing up to the vagus nerves terminates inspiration; while deflation in a similar manner terminates expiration. More recently Haldane and Mavrogordato have shown that the point at which the Hering-Breuer reflex fires off depends on the degree to which the centre is excited by chemical stimuli, *e.g.*, carbon dioxide. If the centre concerned is abnormally irritable the reflex will fire off at a much lesser degree of deflation or distension than normal, and the breath can be held for only a few seconds.

Douglas and Haldane have recently succeeded in reproducing periodic ("Cheyne-Stokes") breathing in perfectly normal individuals. This is done by a special concertina apparatus which controls the depth of the breathing. The sequence of events is: Shallow breathing, anoxæmia, disturbance of the normal stimulation of the respiratory centre by carbonic acid. This periodic breathing can be abolished by adding a little oxygen to the inspired air. Further they found that "Cheyne-Stokes" breathing is more easily produced in the recumbent posture, hence orthopnœa. But this is a digression.

Finally Dr Haldane is of opinion that the neurasthenic symptoms of chronic gas cases are due to a weakening of central control. So that various reflexes run riot, e.g. the Hering-Breuer reflex firing off at inopportune moments upsets the breathing, the accelerator or inhibitory reflex upsets the heart's action and so on.

### Some Clinical Types of Abdominal Tuberculosis

*British Medical Journal* January 3 1920—  
K W MONSMARAT M.D., F.R.C.S. (Edin)

The writer deals with the following types—

1 *Tuberculous peritonitis associated with massive ascudation*—This is in most cases primarily a blood-borne serous infection and is favourably influenced by simple evacuation of the fluid.

2 *Tuberculosis of the ileum*—The lower end is the commonest site. The primary lesion is in the mucous membrane ulceration and necrosis of which are followed by extension to the peritoneal coat causing a local tuberculous peritonitis and a matting together of the bowel surfaces. There are two methods of dealing with this condition, viz—

- (a) Exclusion by lateral anastomosis
- (b) Resection

The choice between these depends on the local extent of the lesion and the presence or otherwise of tuberculosis elsewhere, e.g., in the lungs.

3 *Tuberculosis of the caecum and large bowel*—In this situation massive tumours are as a rule built up. The bowel wall becomes greatly thickened and infiltrated and stenosis of the bowel lumen results. Here again exclusion or resection may be practised, depending on the local extent of the lesion, general condition of the patient, and presence or absence of tuberculosis elsewhere.

4 *Tuberculosis of the rectum*—Here surgical treatment can do little except deal with emergencies such as abscess formation.

5 *Tuberculosis of mesenteric glands*—A common site for a local deposit of tubercle is the mesenteric angle between the caecum and ileum, the usual diagnosis before operation being chronic appendicitis. Enucleation or excision of a mesenteric segment with its glands together with a corresponding length of bowel.

The following suggestions are offered—

1 When tuberculous disease, either of ileum or large bowel, is associated with definite intestinal obstruction, operation is always necessary, and the choice lies between exclusion by anastomosis and excision. If the obstruction is acute exclusion by anastomosis is to be preferred, if the obstruction is sub-acute the exact local condition must decide. A mass that is easily isolated is better removed.

2 When such tuberculous bowel lesions are not associated with obstruction, or with an obstruction that is chronic and capable of relief by aperient, the advisability of operation will depend on whether the bowel disease is or is not the sole demonstrable lesion in the body. If the lung is also affected it will be probably wiser to decide against operation.

3 With regard to disease of the rectum I know of no actual evidence that a remedy is to be found in the establishment of an artificial anus. This has been recommended and practised on the ground that keeping the rectum empty affords a better prospect of resistance and recovery. I know at any rate of one instance in which this procedure added to the patient's discomfort without obvious benefit to the rectal condition. Before recommending this method of treatment we should require a body of evidence that cure of the rectal disease can really be anticipated in a fair proportion of cases. When the rectum is affected above the peritoneal reflection, and is associated with abscess, evacuation of the abscess by the intra-peritoneal route is to be recommended, but except for the treatment of this complication operation has no service to offer.

4 Lastly in selected cases, operation gives good results in limited tuberculous disease of mesenteric glands. According to the extent and stage of the focus this will take the form either of enucleation or of excision of the mesentery involved together with associated bowel.

### Flying and "Air Sickness"

An interesting lecture was delivered recently at a meeting of the Royal Aeronautical Society by Dr C A Swan, followed by a discussion.

Dr Swan emphasised the importance of the subject in view of the rapid approach of commercial aviation and increasing passenger transport. He purposely adopted the popular rather than the purely scientific standpoint, and gave an account of his personal experiences in the rarefied atmosphere of mountain altitudes. The physical and psychical factors appear to be considerably intermingled, the material effects of a low atmospheric pressure are frequently accentuated by emotional disturbances. It seems that there is a definite altitude at which each individual's compensating mechanism begins to feel the strain and individual capacity for readjustment is of greater importance than moderate changes in the environment. Muscular effort naturally increases symptoms of distress, which are variously exhibited as dyspnoea, cyanosis, vertigo, headache, tinnitus, vomiting, fainting, mental excitement, etc.

Simple remedies, such as black coffee, salol and the old guide's remedy of oil of cinnamon on sugar, frequently effect relief whilst the influence of posture is usually marked. The digestive organs and the higher nerve centres play a very large part.

Two types of altitude sickness have been described by Dr Ravenhill: an acute form and a slow form, in which compensation is gradually lost. In the latter, cardiac or nervous symptoms may predominate. Compensation is attained by rise of blood pressure and by hyperpnoea, both of which may be ascribed to a response of the medullary centres to lack of oxygen and psychical influences. In acclimatisation the



acidity of the blood due to non-volatile acids is increased, so that the respiratory centre becomes properly excited, although the alveolar carbon dioxide tension is low, in those who habitually dwell in mountain altitudes the red blood corpuscles are actually increased.

Dr Swan observed that "staleness" in pilots is essentially due to fatigue of the mechanism for acclimatisation, and that rest is the first obvious point in treatment. Other causes of fatigue, such as eye-strain, dental sepsis, blocked nostrils, and mental worry should be eliminated as far as possible. But the pilot flying under war conditions, driving a fast-climbing machine and repeatedly encountering alarming evidence of "hate," presents a very different problem from those who fly in civil life, although a remarkable proportion of war pilots came to grief through influence of altitude whilst many flew successfully who, by all the rules of the game, should have been unfit for aviation in any circumstances.

In the discussion following Dr Swan's address, General Brooke Popham laid stress on the importance of oxygen administration, and said that great benefit was derived from its use in France during the war. Dr Stamm considered that the question of air-sickness will affect airship rather than aeroplane flying, and that the provision of oxygen affords no real difficulty. The chairman, Brigadier-General Bagnall Wild, attaches importance to a healthy digestion, and expressed the opinion that there need be no fear of suffering during passenger flights apart from excessive altitudes (over 15,000 feet) and "stunting."

Aviation as a means of transport would appear to present no serious terrors in this direction to the healthy individual. Our systems are far more adaptable than we are too often encouraged to believe—*The Hospital*

### Castellani's Hæmorrhagic Bronchitis.

J BENECH (*Rev méd de l'Est*, November 1st, 1919) gives the following description of this form of exotic bronchitis, which has been introduced into France since the war, and often simulates tuberculosis. The incubation period is only one or two days. The onset is characterized by tracheo-bronchial pain, followed by muco-purulent expectoration, which is sometimes accompanied by headache and pains in the limbs and often by fever of a few days' duration, ranging from 100.4 degrees to 104 degrees. At the height of the disease the cough becomes less hoarse and the sputum assumes its characteristic appearance. The expectoration is at first slight homogeneous, being constituted by muco-purulent sputum streaked with blood or by a definite viscous hæmoptysis. But the most striking feature is the subsequent hæmolysis of the sputum. The fluid portion becomes pink coloured, while the muco-purulent part turns white and becomes adherent to the wall of the spitting cup or floats in the hæmolytic fluid. The physical signs are those of ordinary bronchitis, with occasional evidence of consolidation at the apices or congestion at the bases. The general condition usually remains fairly good. As a rule the expectoration becomes muco-purulent at the end of three or four weeks and then dries up. The physical signs completely disappear and the patient usually recovers without a relapse. Four varieties of the disease have been described: (1) An acute form, as above, (2) a relapsing form, in which the effect on the general condition is more marked, (3) a chronic form, which may last for years and then assume a rapid and malignant course, (4) associated and complicated forms, which include cases complicated by pneumonia, broncho-pneumonia, tuberculosis, and pulmonary mycosis. On bacteriological examination of the sputum the *Spirochaeta bronchialis*, which is the causal agent of the condition, is found in enormous numbers. The prognosis is generally favourable. The most serious event is for the

disease to become chronic, as this often gives rise to a serious general condition and favours the development of intercurrent pulmonary disease. There is no specific treatment, but Castellani recommends antimony tartrate as the only drug which appears to have a definite action on the hæmorrhagic process—*British Medical Journal*, December 20, 1919

At the annual meeting of the Société de Pathologie Exotique, held on 10th December, 1919, Lieutenant-Colonels Sir Leonard Rogers and C Donovan were elected Associate Members of the society. We heartily congratulate them on the honour thus bestowed on them.

### LT COL. SIR W J BUCHANAN SCHOLARSHIP FUND ACCOUNT.

		Rs. A P	
1919			
March	28 Lt Col W D Sutherland, I M S.	100	0 0
	27 Lt. Col A Leventon, I M S	150	0 0
	27 Lt. Col D Green, I M S	150	0 0
April	1 Lt. Col W R Newman, C I F, I M S	100	0 0
	2 Lt Col J T Calvert O I E, I M S	150	0 0
	10 The Hon Major Genl W R Edwards O B., C M O I M S.	200	0 0
	Dr K K Chatterjee, F R C S I	50	0 0
	12 Lt. Col F O'Kinealy, I M S	500	0 0
	29 Sir Francis Stewart, C I F	100	0 0
	26 Lt Col J W Cornwall, I M S	100	0 0
May	26 Lt. Col C R. M Green, I M S	200	0 0
	31 Lt Col R E Turner I M S	150	12 0
June	17 Major H H Thornely, I M S	100	0 0
	17 Major C E Palmer, I M S.	50	4 0
July	1 Dr R Ashe	32	0 0
	5 Lt. Col D G Crawford, I M S.	150	0 0
	23 Lt Col F P Maynard, I M S (retired)	100	0 0
	23 Lt Col J Entrican, I M S	50	0 0
	28 Lt. Col W B Lane, I M S.	100	0 0
Augt	11 Lt. Col F P Connor, I M S.	100	0 0
	Lt Col E A. W Hall, I M S	150	0 0
Sept.	2 The Hon Col J K Close, I M S	150	0 0
	9 Lt Col G Hutcheson, I M S	200	0 0
Nov	1 Lt.-Col Sir Leonard Rogers, C I E, I M S	150	0 0
	12. Major F A Salisbury, I M S	75	0 0
1920			
March	19 The Hon Major Genl. W. R B. Robinson, C B, I M S.	200	0 0
	19. Lt Col A G Caullie, I M S	75	0 0
	Lt.-Col D M McCay, I M S.	500	0 0
	Proprietors, <i>Indian Medical Gazette</i>	500	0 0
	A R Murray, Esq., C B E	100	0 0
	Lt. Col H S Wood I M S	50	0 0
	W Kirkpatrick, Esq	175	0 0
	Col. J Jackson, O I E, I. M. S.	100	0 0
		4,733	0 0
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		4,768	4 0
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		4,765	3 0

### X-Rays in the Treatment of Tuberculous Adenitis.

*The British Medical Journal*, December 20, 1919

DR FRANCIS HERNAMAN-JOHNSON writes—

I was interested to read in the *British Medical Journal*, of November 29, an article by Mr E S Molyneux on the use of radium in tuberculous glands of the neck.

The results of unaided surgery in such cases can hardly be considered good, recently I came across a case on which fourteen operations had been performed within six years, and a fifteenth was in contemplation. This may be an exception, but half a dozen operations are quite usual, and the cosmetic results leave much to be desired.

The effects of treatment by radium on early cases are no doubt excellent but the point I wish to make here is that eminently satisfactory results may be attained by X rays which are, as a rule more readily available than radium. While X-ray treatment alone will cure the very early case, it is, in my experience, usually desirable to call in a surgeon when all the periglandular inflammation has subsided, and the glands can only be detected on careful palpation. An operation at this stage—which is usually reached after about six to eight weeks of X-ray therapy—is a very simple matter and the scar should be practically invisible. If the operation be not done a considerable number of apparent cures will relapse and do not a second time yield so easily to treatment. Pre operative treatment, if given with proper dosage and filtration does not in any way unfit the skin to withstand surgical trauma.

A case in which softening is already present should be dealt with at once surgically, but should be treated by X rays very soon after the operation. If this is done discharging sinuses will heal in a few weeks instead of taking months as is sometimes the case if they are left to themselves.

## Reviews.

ON GUNSHOT INJURIES TO THE BLOOD VESSELS.—By SIR GEORGE HENRY MAIR, F.R.C.S. CH. PRAC.  
Bristol: Wright and Sons, Ltd. 1919. Super roy.  
8vo. Pp. xi + 251. 60 figs. 4 plates. 21/- nett.

THE experiences of the Great War have added vastly to our surgical knowledge and this applies especially to injuries of blood vessels. The author of 'Gunshot Injuries to the Blood Vessels' makes no attempt to deal with the literature of the subject but he gives us a first-hand account of the surgery of vascular injuries, on which he is an admitted authority.

The subject is first dealt with generally and compared with the findings of other campaigns, anatomical considerations, symptoms and signs of the various types of injury and the problems of treatment are fully discussed. In the final chapters special points in connection with the individual vascular lesions are gone into.

The book should be read by every surgeon, because it is important that all should realize that many of the statements laid down in pre-war text books will now require wholesale revision. As an example of this, the teaching with regard to ligature of a main artery may be mentioned. Ample proof is brought forward that ligature of both artery and vein for the arrest of hæmorrhage is a safer proceeding than ligature of the artery alone. One cannot but feel sympathy for the restless spirits of those who in past generations were "referred" in operative surgery examinations for tying both artery and vein!

DISEASES OF THE SKIN.—By RICHARD L. SUTTON, M.D.  
910 illustrations and 11 coloured plates. 3rd edition, revised and enlarged. London. 1919. Henry Kimpton. Price 42s. nett.

THIS work is now in its third edition, which proves that it is of use to the medical profession, as indeed it could not fail to be, for it is

by far the best illustrated treatise on dermatology that we know of. It is also a reliable guide to treatment. Need we say more?

SYPHILIS. A TREATISE ON ETIOLOGY, PATHOLOGY, DIAGNOSIS, PROGNOSIS, PROPHYLAXIS AND TREATMENT.—By HENRY H. HAZEN, A.B., M.D. With 160 illustrations, including 16 figs. in colours. London. 1919. Henry Kimpton. Price 36s. nett.

THIS is another of the beautifully illustrated works published by Mr. Henry Kimpton, whose perusal amply repays the reader. The author has had the various sections written by acknowledged authorities, and added thereto his own ripe knowledge of the subject, with the result that we have here an authoritative work, which many a practitioner will find to be a very present help in time of trouble.

We note that due prominence is given to the blighting influence exercised, albeit *bonâ fide*, by John Hunter on the study of the nervous manifestations of the disease, which he asserted did not exist, although older observers had carefully noted their occurrence. We do not agree with Nonne that extra genital chancres are no more dangerous in leading to nervous complications than genital chancres for we believe that all chancres that lie above the line of the lower jaw are more apt to cause serious cerebral involvement than those at any lower site. But we heartily agree with the dictum that the later in the disease the symptoms of cerebral involvement occur the worse the prognosis as a rule, and we would add that in cases of chancre of the mouth, etc., the symptoms are prone to appear early and to be very severe. It is good to read that whenever we know that a middle-aged person has syphilis we should be on the look-out for signs of general paresis in his case, and, dismissing from our minds the picture of the grandiose, exalted parietic, concentrate our attention on minor points, such as alteration in his habits, *plus* the four cardinal signs—defects of speech, abnormal knee-jerk, Romberg's sign and the Argyll-Robertson pupil.

The discovery made by Dr. Reaumur that soap almost instantly kills the *treponema pallidum* is insisted upon, and ought to be more widely known than it is for unquestionably the future of the human race depends greatly on the measures that are now taken to prevent the spread of syphilis.

As medical men we are more concerned with public health than with morals. As citizens we ought to realise that, since at least 20 per cent of all cases of syphilitic infection take place "innocently," it is foolish to argue that by recommending the use of the condom or Metchnikoff's ointment we are "condoning immorality." Even the legal mind has evolved the maxim that it is better that a criminal should escape than that an innocent man should suffer.

When the rest of the world has attained to the level of common sense reached by the State

of Western Australia, and enacted similar laws, the control of syphilis will be easy But not till then

The methods of treatment described will be found efficacious, but we think that the author has taken too gloomy a view of the likelihood of cure

**AIDS TO OPHTHALMOLOGY**—By N BISHOP HARMAN, M.A., M.B. (Cantab.), F.R.C.S. Sixth edition. Size F'cap 8vo. Pp 226. Figures in text 112. London Bailliere, Tindall and Cox. Price 3s 6d nett

It is unnecessary to say much about this well-known series of publications. The sixth edition has been carefully revised and brought up to date. New illustrations have been added. In fact the present volume retains all the good points of last edition and the weak points have been strengthened. While by no means pretending to be a complete exposition of the subject, this little book should prove specially useful to the student working for examinations, and to the general practitioner who has little time to devote to special branches of his profession such as ophthalmology.

**A TEXT BOOK OF SURGERY**—By W. Q. WOOD, M.D., F.R.C.S. (Edin.). Pp 554. Edinburgh James Galloway. Price 15s nett

The author states that the object of this volume is to provide the student with a text book which he can conveniently read in connection with a course of lectures on surgery. As pointed out, the student has no time to read the majority of text-books on surgery and requires help to keep in touch with lectures. Viewed from this standpoint the present volume should meet with universal approval.

A special feature is the sub-division of the various subjects into sections under the headings Etiology, Pathology, Clinical features, and treatment.

The advisability of omitting illustrations may be questioned. It will be generally admitted, however, that illustrations, unless of a high grade, are worse than useless. The general "get up" and avowed object of this volume are such as to render the inclusion of first-class illustrations improbable, at any rate without greatly increasing the size and expense of the book and thereby diminishing its utility.

On the whole we may congratulate the author on having produced a useful and readily accessible introduction to surgery for the student.

**ROENTGEN INTERPRETATION A MANUAL FOR STUDENTS AND PRACTITIONERS**—By GEORGE W. HOLMES, M.D., and HOWARD E. RUGGLES, M.D. 205 pages, illustrated with 181 engravings. London Henry Kimpton.

THIS little volume supplies a want which has long been felt by students and practitioners. In the average book on X-ray the question of Roentgen Interpretation is obscured and relegated to a back seat by the mass of technical details. In the volume under review only such technical details are given as are necessary for the proper understanding of the "shadow-graph."

The whole range of medicine and surgery is covered and practically all the important conditions are illustrated by skiagrams excellently reproduced.

The authors are to be congratulated on having produced a volume of real utility to the radiologist, physician and surgeon.

**X-RAY OBSERVATIONS FOR FOREIGN BODIES AND THEIR LOCALISATIONS**—By CAPTAIN H. C. GAGE, A.R.C.O.I.P. Consulting Radiographer to the American Red Cross Hospital of Paris. London William Heinemann, Ltd. Pp 83. Price 6s nett.

THIS little volume, which was to have been a chapter on the localisation of foreign bodies in a work that was being compiled for the American Council of National Defence, presents in a small compass the theory and practice of the most modern and accepted methods of localisation of foreign bodies. It is the product of four years' experience under war conditions and unique opportunities in the study of localisation of missiles of various kinds.

The book is profusely illustrated with photographs, skiagrams and drawings. The type is bold and clear. It includes a description of such aids to extraction as the telephone probe, the Bergonie Vibrator, etc., and, therefore, may be perused with profit, not only by the radiologist, but also by the operating surgeon.

**OTO-RHINO-LARYNGOLOGY FOR THE STUDENT AND PRACTITIONER** By DR. GEORGES LAURENS.

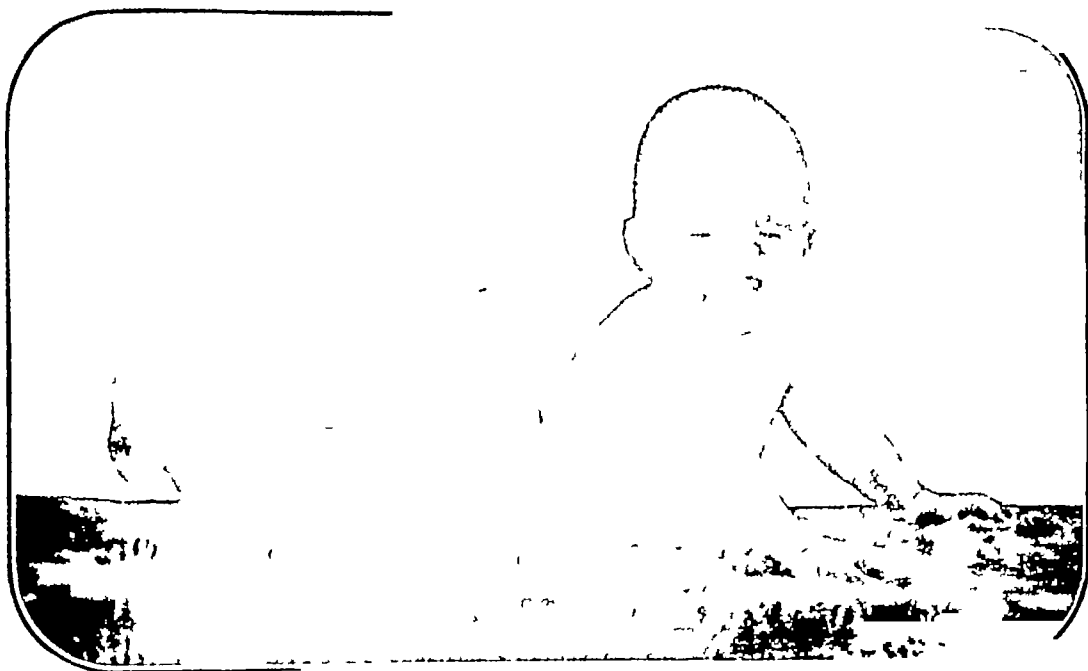
THIS small volume, running to about 320 pages, is the English translation, by Dr H. Clayton Fox, of the second French edition of Dr Georges Laurens' work. We have read the book with great pleasure and much profit, and have nothing but praise for it. From beginning to end it is crammed full of sound practical instruction and explains with great preciseness and clearness innumerable little points that are essential to success when dealing with these special sense organs. The book covers a wonderfully wide field, is attractively written and contains no less than 592 helpful illustrations. We know of no book that compares with it for general usefulness and can confidently recommend it to the general practitioner, for whom it is chiefly intended, and to the specialist alike.

IN the review of Lieut.-Col O'Meara's *Medical Guide for India*, which appeared in the GAZETTE for April, the name of the publishers—Messrs Butterworth and Co (India), Ltd—and the price—Rs 12—were, by an oversight, not mentioned.

## Correspondence.

To the Editor of THE INDIAN MEDICAL GAZETTE

SIR,—Workers in the field of vaccine lymph production will, I am sure, be very grateful to Colonel Entrican,



BABY SELMAN

## Reared from birth on Virol.

Kamptee, Central Provinces, India.

25th February, 1916

DEAR SIRs,—I have much pleasure in sending you a photograph of one of my children, both of whom were reared from birth on "VIROL". My children are very big and bonny and everyone asks me "What do you give them?" so that we are constantly recommending Virol, and several of our friends are using it with excellent results.

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—Yours faithfully,

(Signed) B B SELMAN

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for his very interesting report of the work carried out at the Vaccine Depot Meiktila (see your issue of March 1920)

I agree with him in the desire he expresses for more interchange of ideas among those engaged in the difficult and responsible work of producing a pure vaccine lymph which will withstand the very adverse conditions of a tropical climate. Papers such as he has favoured us with are a great help and I am sure many, like myself would welcome a more detailed account of the methods in use at Meiktila.

I may be allowed however to draw the attention of your readers to certain facts which may be of interest in view of statements made by Colonel Intricau in his paper.

The Vaccine Institute, Peltam, issued during the year 1918-19 a total of 1,96,620 doses of vaccine lymph. All lymph was purified by the chloroform process and examined bacteriologically before issue. The ease and inaction necessitated by the Presidency Districts to whom 520,310 doses of lymph were issued was 99.64 and 97.64 respectively. Vaccination is carried on in all the districts of the Presidency and Sind the whole year round. The high temperatures recorded in Sind during the hot season are notorious and many vaccinators in Sind outlying districts do not receive their lymph packets until from 9 to 10 days from the time they are despatched from Peltam.

I would like to point out in connection with these results that the system of verification in the case of the work of Bombay Presidency vaccinators is very efficient. There are five Deputy Sanitary Commissioners on tour in the districts during the year who exercise a strict supervision over the work of the vaccinating staff.

Many methods having for object the removal from lymph of extraneous microorganisms without injury to the vitality of the essential virus have been tried at this Institute. Mixing with 50 per cent pure glycerine and distilled water and subsequent passage of chloroform vapour carefully controlled by bacteriological tests has proved most satisfactory and has withstood the test of experience covering over ten years work. Colonel Intricau I am sure will forgive me if I express surprise at his wholesale condemnation of chloroform.

Thanking you in anticipation for publishing this letter

Yours etc.

R W FISHER M.D. DPH,  
Director

VACCINE INSTITUTE

PELTAM 27th March 1920

MR. KRISHNAIAH J. DHOLAKIA L.M.S., Bhuj, writes to ask whether the pityriasis versicolor which he has so often met with in phthisical patients has any bacteriological affinity with phthisis. —No pityriasis versicolor is due to the microsporon furfur a mould. We should much like to have photographs of the cases in which this condition has been seen by our correspondent on the lower part of the face for this is an uncommon site.—Ed I.M.C.

## Service Notes.

LIEUT-COLONEL B H DEARE MRCP DPH, IMS, Officiating Principal and Professor of Medicine, Medical College Calcutta, and First Physician to the College Hospitals, is confirmed in that appointment, with effect from the 6th October, 1919.

LIEUT-COLONEL D McCAY, M.D., IMS, Officiating Professor of Clinical Medicine and Materia Medica, Medi-

cal College and 2nd Physician to the College Hospitals, is confirmed in that appointment with effect from the 6th October, 1919.

MAJOR J A SHORTEY, MB IMS, Officiating Professor of Physiology Medical College, Calcutta is appointed substantively *pro tempore* in that appointment, with effect from the 6th October 1919.

TEMPORARY COLONEL F A F BARNADO CBE CIE MB FRCS IMS, is appointed to be Civil Surgeon Simla (East), with effect from the forenoon of the 15th March 1920.

LIEUT COLONEL SIR LEONARD ROGERS Kt CIE FRS MD FRCP FRCS IMS Professor of Pathology Medical College Calcutta, is granted with effect from the 1st March 1920 combined leave for 12 months *vis* privilege leave for six months and in continuation furlough for six months.

MAJOR R KNOWLES, IMS Director of the Pasteur Institute and Clinical Research Laboratory Shillong is appointed to officiate as Professor of Pathology Medical College Calcutta *vice* Sir Leonard Rogers with effect from the 1st March 1920 until further orders.

LIEUT COLONEL R F STANDAGE Indian Medical Service (Bombay) an Agency Surgeon is granted privilege leave for five months and twenty days with effect from the 10th March 1920 or the subsequent date on which he avails himself of the leave.

MAJOR E C C MAUNSELL Indian Medical Service, Staff Surgeon, Bangalore, is appointed to officiate as an Agency Surgeon and as Residency Surgeon Mysore, in addition to his own duties during the absence on privilege leave of Lieut-Colonel R. F Standage, Indian Medical Service.

THE following acting promotion is notified, subject to His Majesty's approval —

Temporary Captain V N Agate Indian Medical Service (Temporary Commission) to be acting Lieut-Colonel while commanding a Combined Field Ambulance, from the 20th June 1919, to the 31st October, 1919.

THE grant of the honorary temporary rank of Major to the officers mentioned in the Army Department Notification No 1002 dated the 17th May, 1918 was only operative for so long as those officers were employed at the Lady Hardinge War Hospital, Bombay.

### INDIAN DEFENCE FORCE.

#### Medical Corps

SUBJECT to His Majesty's approval, Surgeon-Lieut-Colonel Ernest Edward Francis late Assam-Bengal Railway Rifles to be Lieut-Colonel Dated 1st April, 1917.

SUBJECT to His Majesty's approval, the services of the undermentioned officers are dispensed with, being no longer required, with effect from the 18th January, 1920.

Temporary Lieut Yaqub Beg

Temporary Lieut Kanai Lal Bose.

LIEUT-COLONEL R. A NEEDHAM, CIE DSO, IMS, Deputy Director-General Indian Medical Service, is granted with effect from the 19th March, 1920 or any subsequent date on which he avails himself of it, combined leave for 8 months *vis*, privilege leave for 6 months and in continuation furlough on average salary for two months.

MAJOR K. G. GHARPUREY, I M S, on reversion from the Military Department, was placed on general duty at the Sassoon Hospitals, Poona, from the 21st January, 1920, to the 26th January, 1920, both days inclusive

THE services of Major S W Jones, O B E, I M S, are placed permanently at the disposal of the Government of Bombay

IN exercise of the powers conferred by clause (b) of sub-section (1) of section 4 and section 10 of the United Provinces Medical Act (III of 1917), the Local Government is pleased to nominate Lieut-Col A W R. Cochrane, M B, F R C S, I M S, to be a member of the United Provinces Medical Council, *vice* Lieut-Col G T Birdwood, I M S, resigned

CIVIL SURGEON LIEUT-COLONEL R H MADDOX, C I E, I M S, made over charge of the Arrah Jail to Officiating Civil Surgeon Babu Rajeshwar Prasad on the afternoon of the 25th February, 1920

CIVIL SURGEON LIEUT-COLONEL B R CHATTERTON, I M S, made over charge of the Hazaribagh Central Jail to Civil Surgeon Lieut-Colonel R H Maddox, C I E, I M S, on the afternoon of the 29th February, 1920

THE names of the undermentioned Officers, Warrant Officers Non-Commissioned Officers and Men have been brought to the notice of the Secretary of State for War in accordance with the terms of Army Order 193 of 1919, for valuable services rendered whilst prisoners of war or interned. Dated 5th May, 1919 —

Lieut-Col E F C Brines, I M S  
Capt R C Clifford, D S O, M C, I M S

#### INDIAN MEDICAL SERVICE

##### Captains to be temp Majors

J R D Webb 25th February, 1918  
R B Nicholson 12th March 1918  
W R Stewart 23rd May, 1918

##### Temp Lieutenant to be temp Captain

Edward Nissim 6th August, 1919

THE following acting promotion is notified, subject to His Majesty's approval —

Lieut-Colonel A M Fleming, Indian Medical Service, to be acting Colonel while holding an appointment as Assistant Director of Medical Services. Dated 17th August, 1919

SUBJECT to His Majesty's approval the services of temporary Captain Narayan Keshinath Desai are dispensed with, on account of physical disability, with effect from the 8th January, 1920

THE date of the grant of the temporary honorary rank of Captain to Raj Kishore Kacker is the 23rd August, 1919, and not as stated in Army Department Notification No 2632, dated the 15th August, 1919

LIEUT-COLONEL D McCAY, M D, I M S, officiating Professor of Materia Medica and Clinical Medicine, Medical College, Calcutta, and Second Physician, Medical College Hospitals, is granted, with effect from the 15th March, 1920, or any subsequent date he avails himself of it, combined leave for eight months, *viz*, privilege leave for 5 months and 13 days under article 260 of the Civil Service Regulations, and the Government of India, Finance Department letter No 168-C S R, dated the 24th February, 1919, and thereafter furlough under article 308 (b) of the Civil Service Regulations and the

Government of India Resolutions No 1514-C S R, dated the 29th December, 1919

MAJOR J D SANDES, M B, I M S, Surgeon to His Excellency the Governor of Bengal, is appointed to officiate as Professor of Materia Medica and Clinical Medicine, Medical College, Calcutta and Second Physician, Medical College Hospitals, during the absence on leave of Lieut-Colonel McCay, M D, I M S, until further orders

THE following officers of the I M S are permitted, subject to His Majesty's approval, to resign their Commissions —

1 Temp Capt Leonard John Panllett Mordaunt, with effect from 31st December, 1919

2 Temp Capt Piyara Lal Tandan, with effect from 21st January, 1920

THE promotion to the rank of Captain of the undermentioned officers is antedated to the 30th March, 1915, but will not carry pay before the 1st September, 1916 —

John Dykes Wilson, M B (since deceased), Laurence Alfrey Pelham Anderson, William Calder Paton, M C, M B (Brevet Major), James Bennett Hance, M B; Stephen Gordon, M C, Harold Kirkby Rowntree, M C, M B, Graham Yalden Thomson, M B, Basil Franklin Eminson, M B, Anthony Kennedy, Sorab Dhunjibhoy Ratinagar (since deceased), Colin McIver, Jordan Constantine John, O B E, M B, Richard Reginald Maitland Porter, M C, M B, Robert Sweet, D S O, M B (temp Major), Edward Calvert, M B, John Robert Douglas Webb, O B E (temp Major), Francis Phelan, Archibald Campbell Macrae, M B, Nawin Chand Kapur, Arthur Hilary Clifton Hill, Joseph Francis Holmes, Narayan Krishna Bai, M C, Haji Sulaiman Gulam-Hossein Haji, M C, Saheb Singh Sokhey, M B, Atul Krishna Sinha, M B (since deceased), Subramania Doraisamy, Allan Seddon, M B, James Findlay, M B, William Collins Spackman, M B, Jyotish Chandra De, M B, Nanulal Maganlal Mehta, Robert Morrison Easton, M B, Charles Henry Powell Allen, Reginald Victor Martin, George Henry Mahony, M B (acting Lieut-Col), Gordon Covell, M B, William Ross Stewart, M B (Brevet Major), Kotyvenkata Ramnar Rao, John Gregory Owen Moses, M B, Hari Chand, M C, Venkatasubba Mahadevan, Alured Charles Lowther O'Shee Bilderbeck, M B, Jacob William Van Reenen, M B, Basil Fraser Beatson, Maurice James Roche, M C, M B (since placed on the permanent half-pay list), Neehal Das Puri, M B, Prabodh Chandra Roy, M B, Monindranath Das, M C, Jagannath Balkrishna Vaidya, Joseph Martin Reeves Hennessey, Alfred Glen Cowper, William Mawhood Lupton, Hubert Horan Brown, Charles Henry Neil Baker, M C, John Walter Pigeon, Maurice Lawrence Treston, Peter Vieyra, M B, Bhamini Mohan Mitra, Philip Savage, Amir Chand, M B, Robert Lee, M B, Nilkanth Shriram Jaisir D S O, Tadepally Sankara Sastry, M B, Jamal-ud-din, M B, Ferozeshah Bapuji Chenoy (since deceased), Sadanata Bashiam Venugopal, Charles deCarteret Martin, M B, Joseph Henry Smith, M B

## Notice.

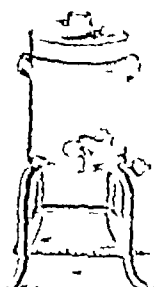
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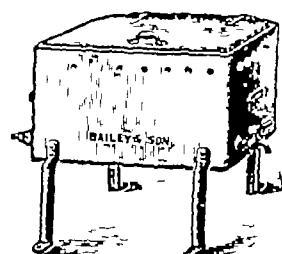


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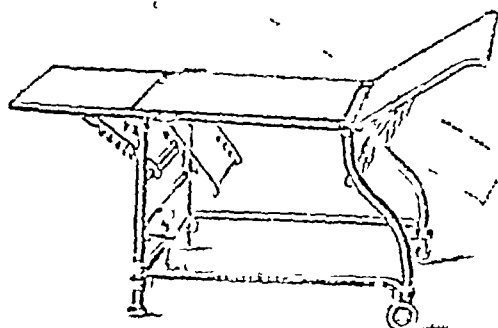
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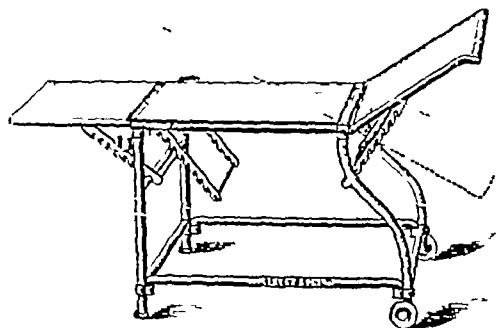


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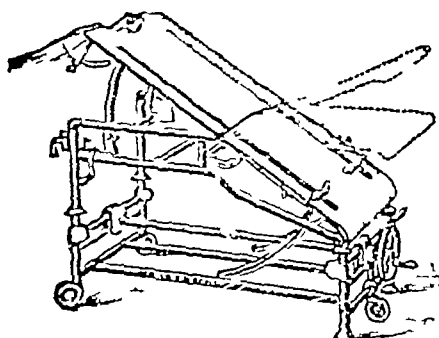
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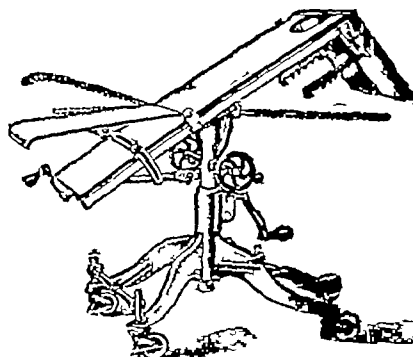
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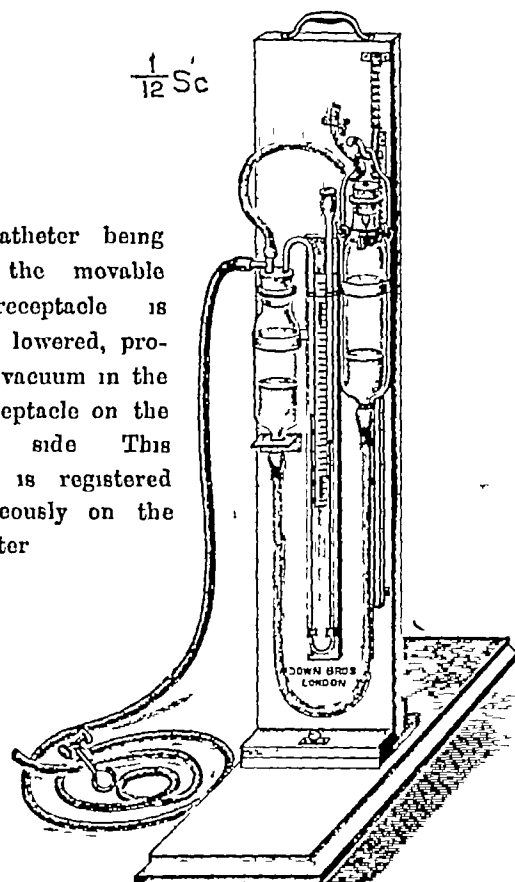
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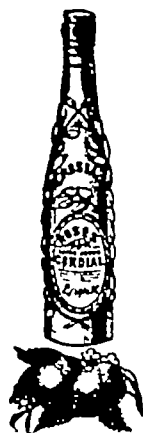
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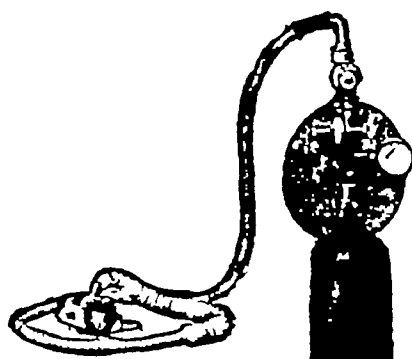
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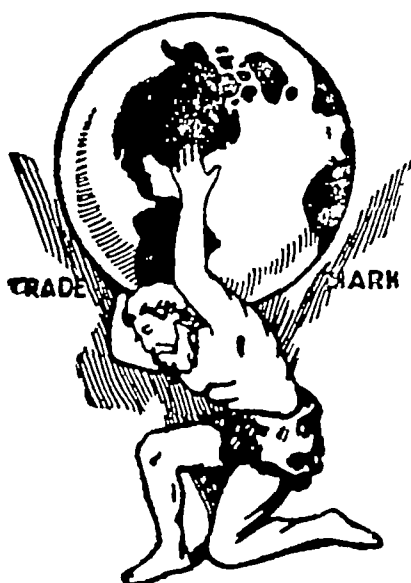
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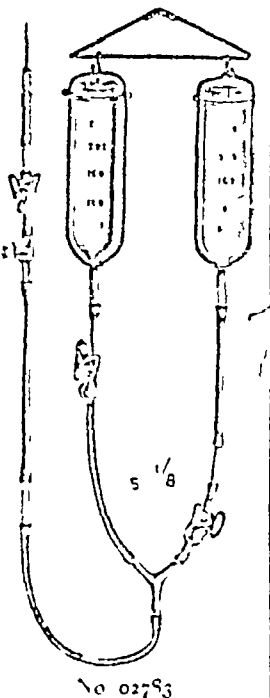
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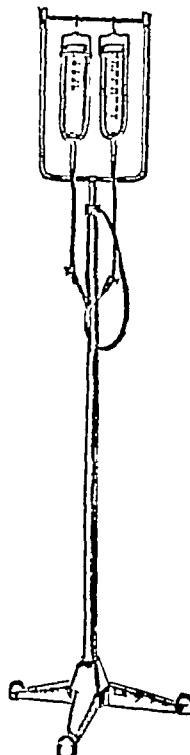
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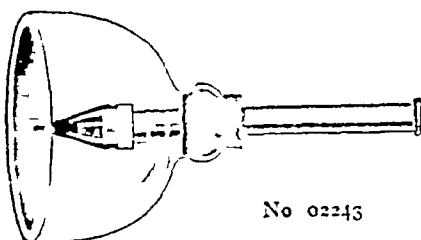


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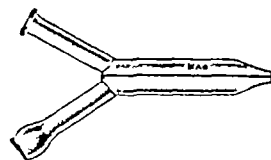
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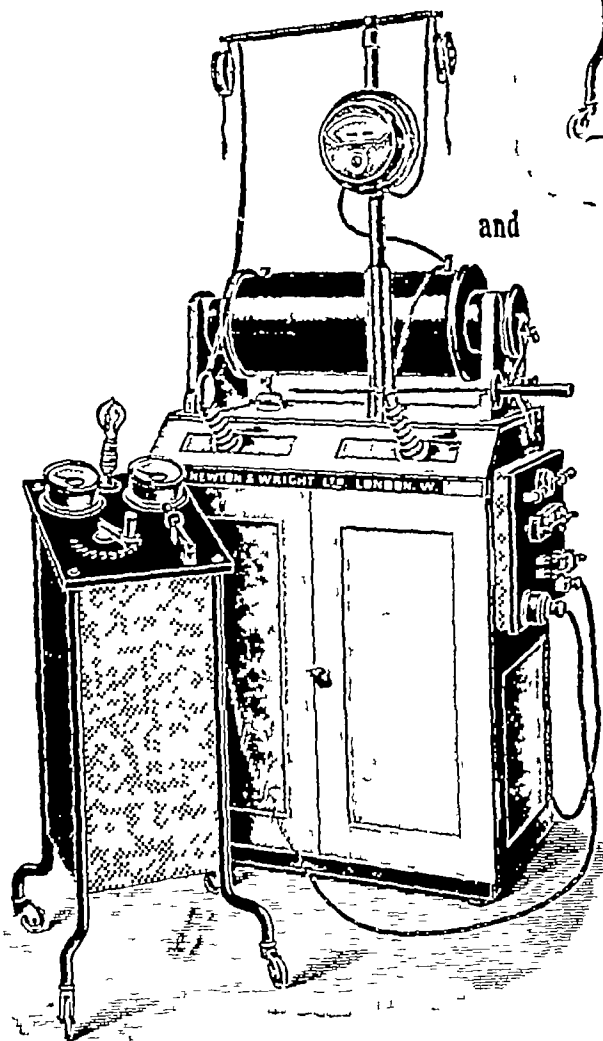
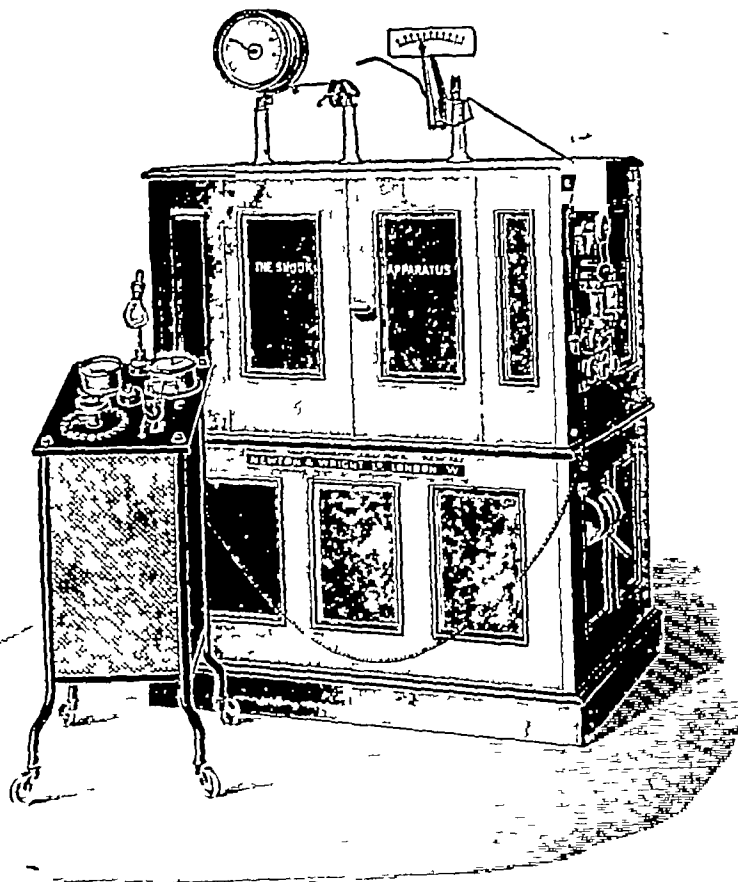


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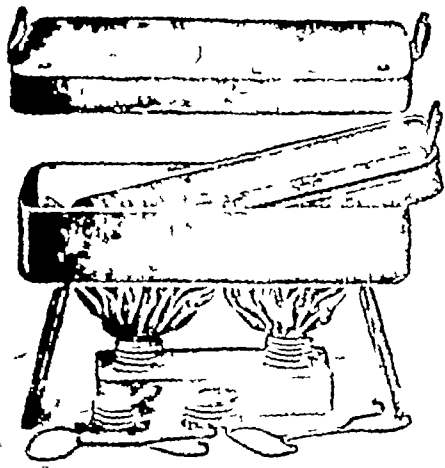


Fig 983

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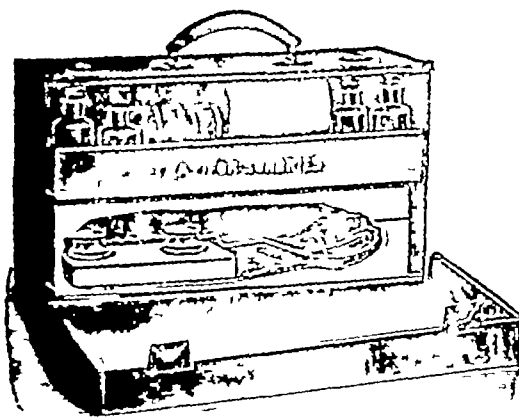


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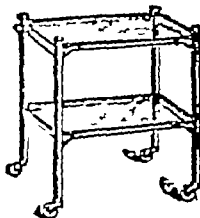


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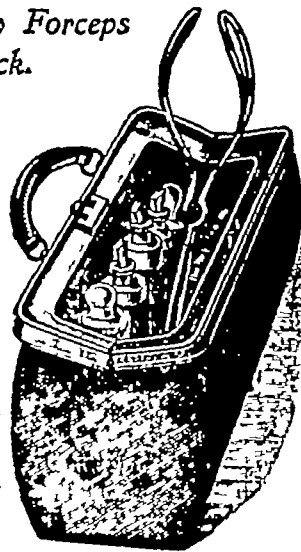


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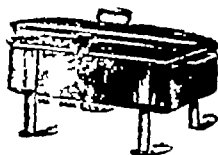


Fig 1443

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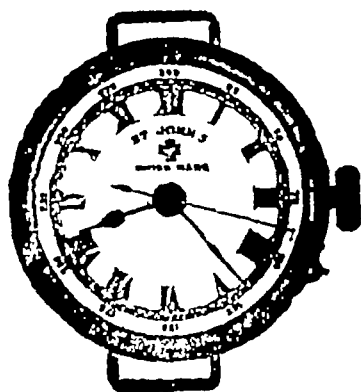


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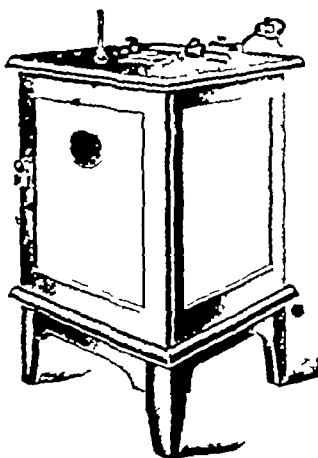
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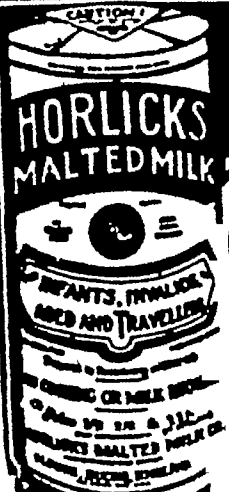
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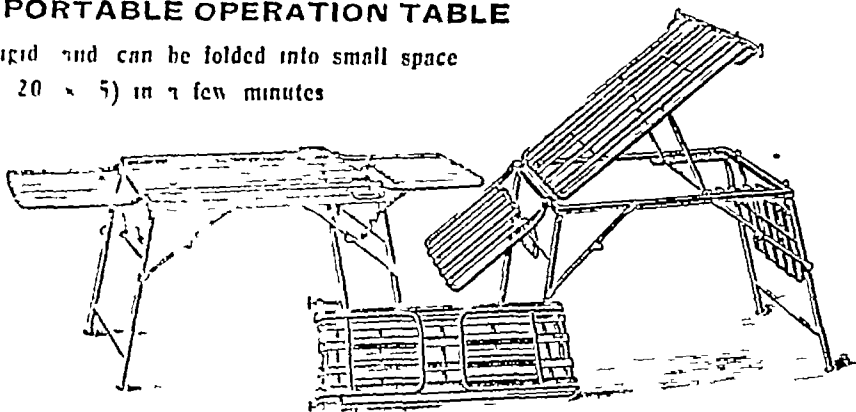
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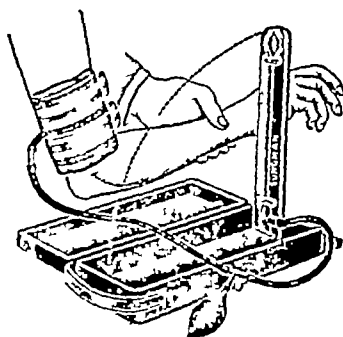
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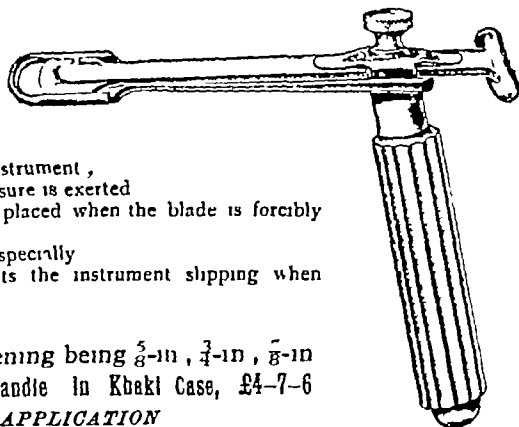
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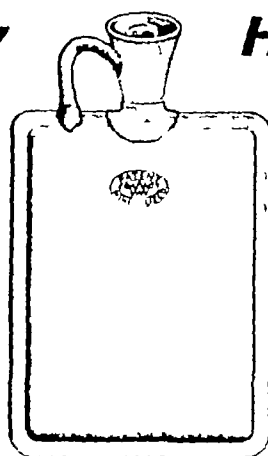
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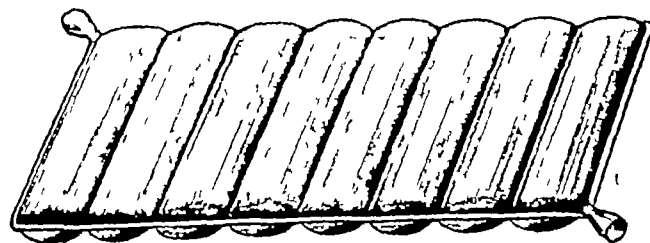
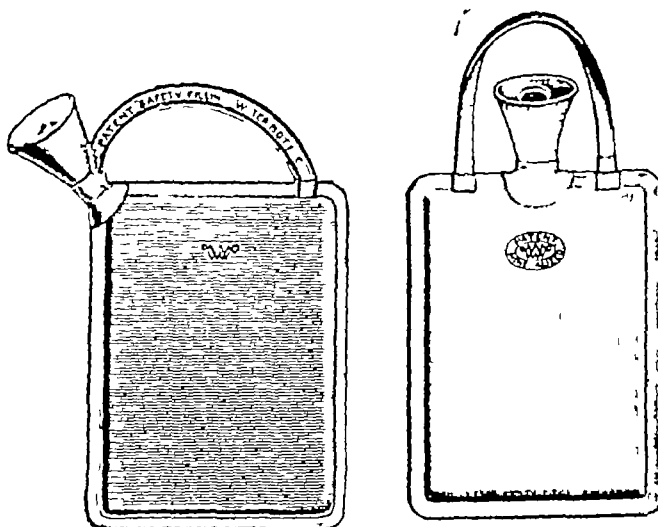
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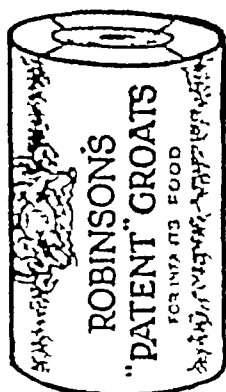
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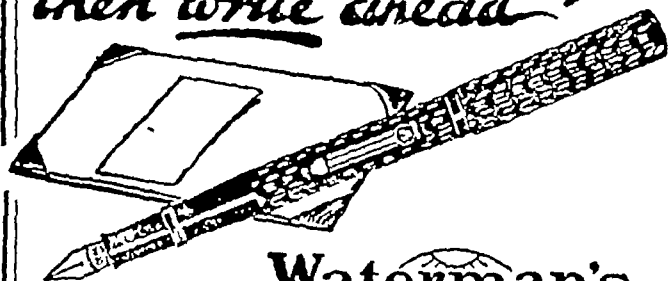
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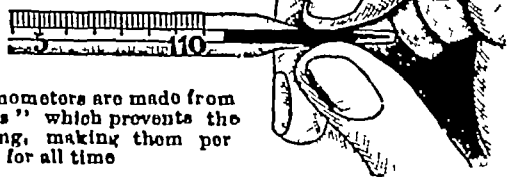
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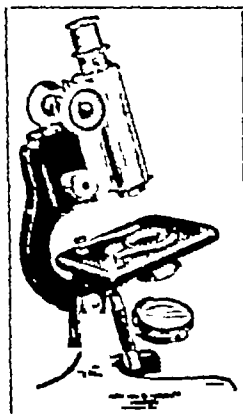
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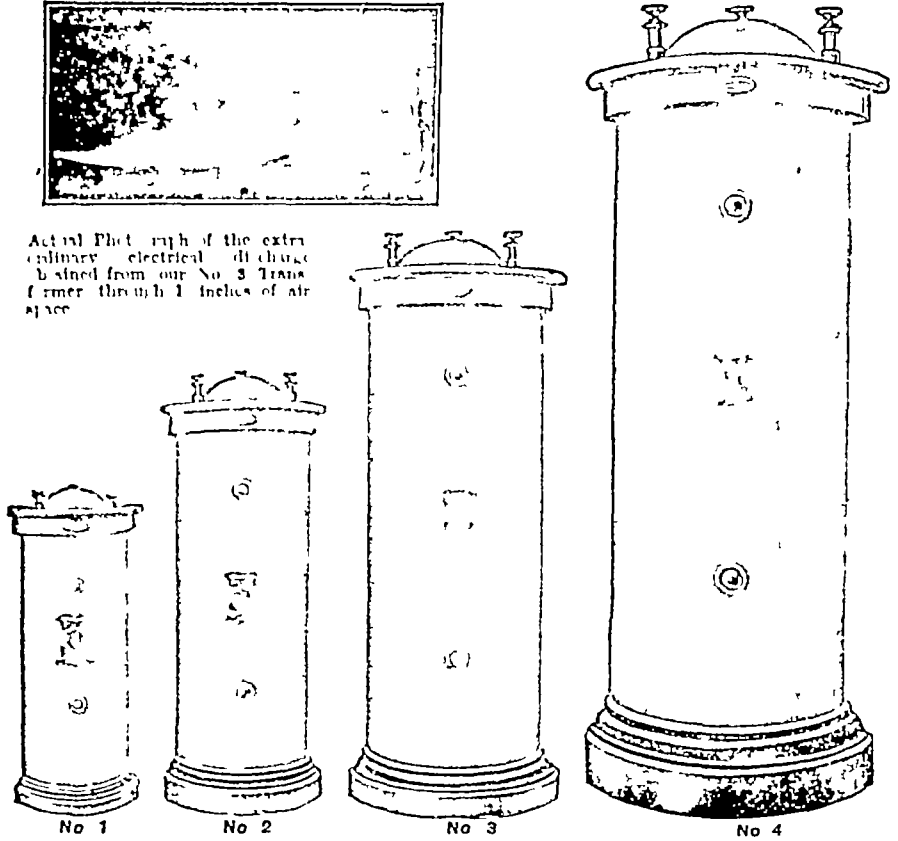
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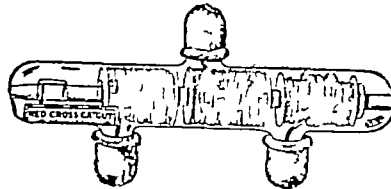
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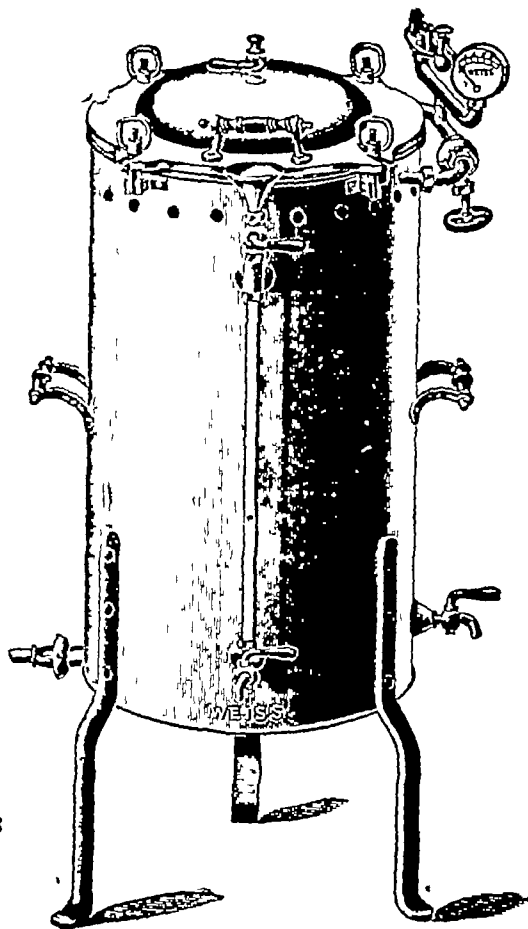
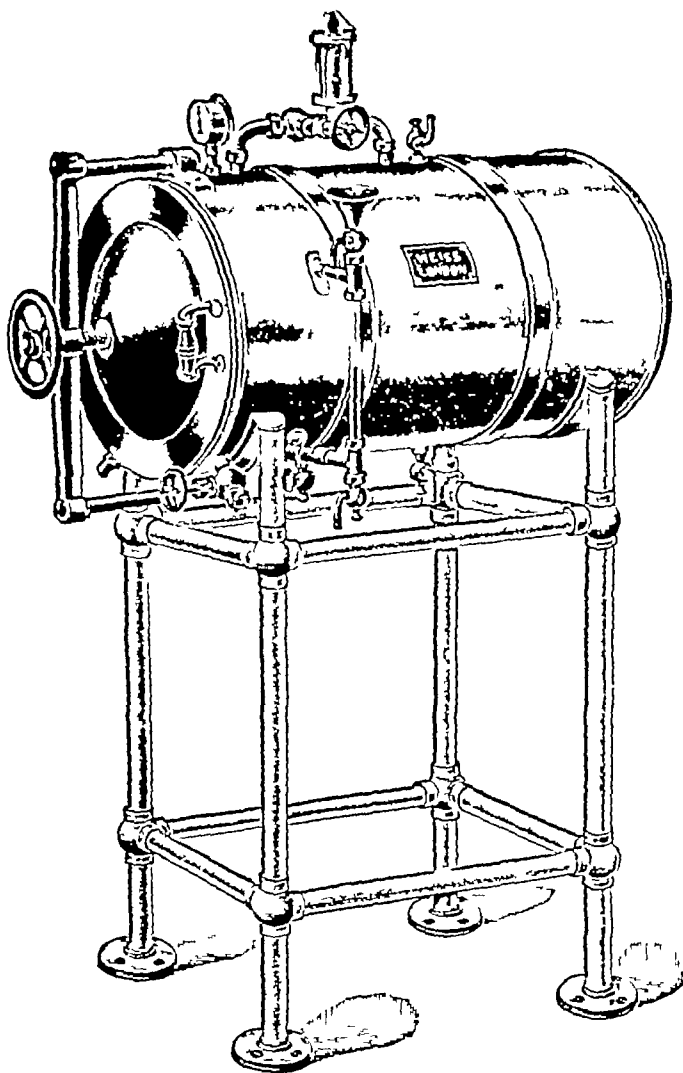
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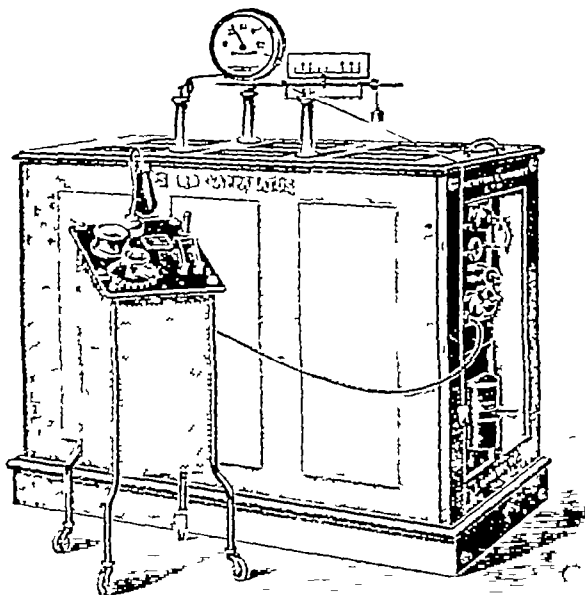
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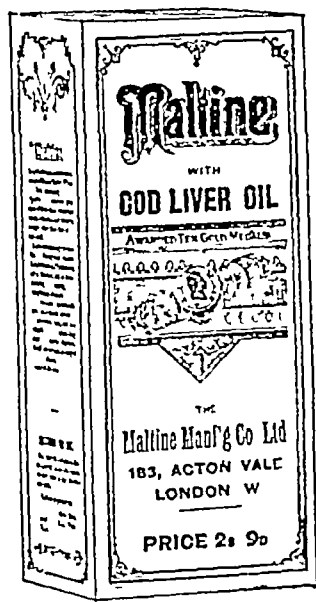
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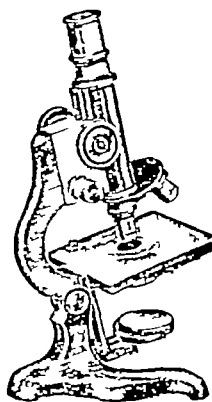
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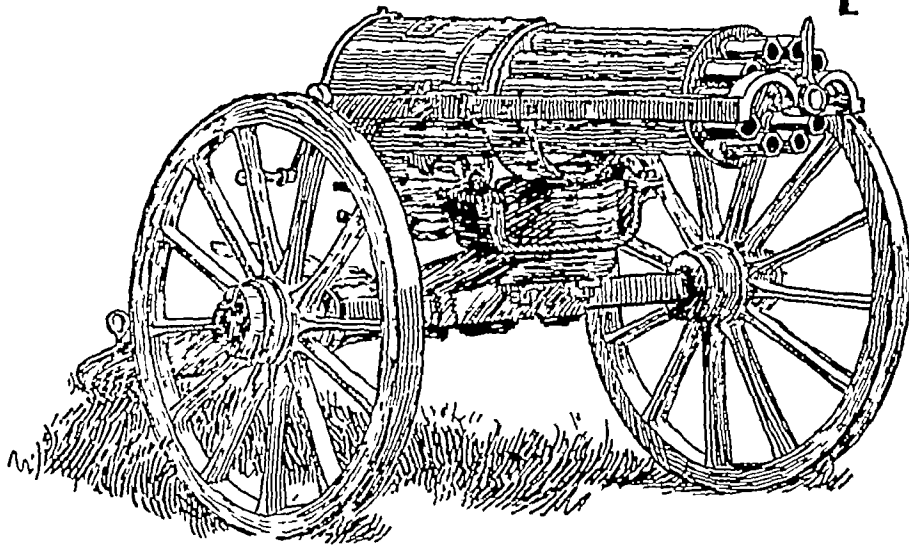
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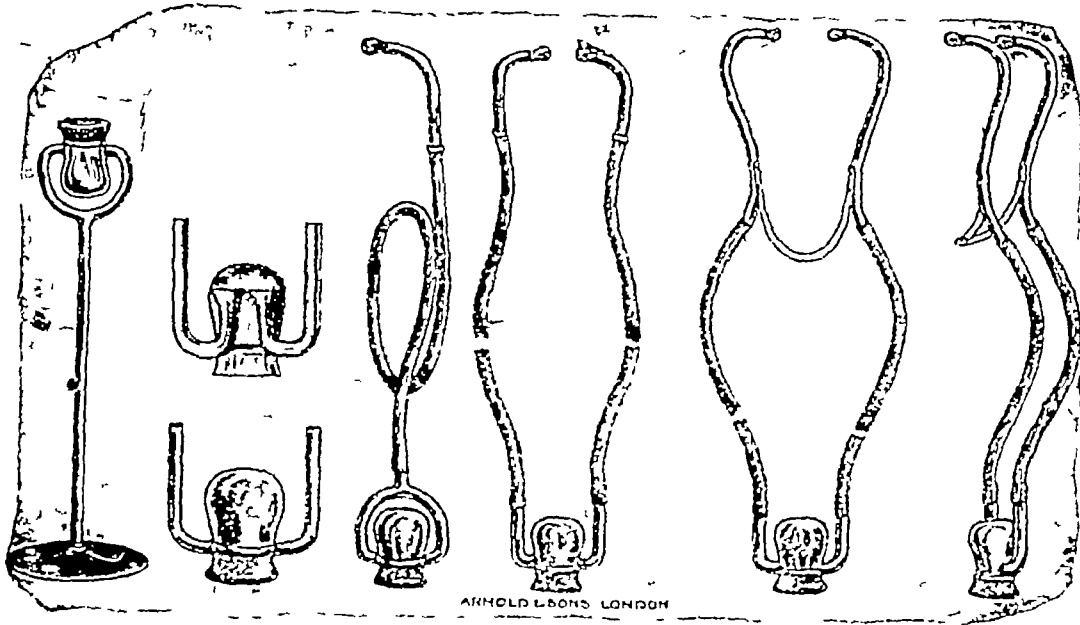
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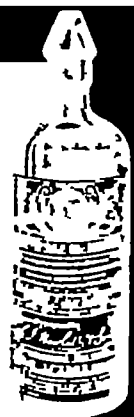
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Literature mailed on request

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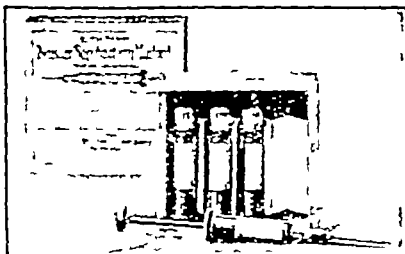
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## Neisser Serobacterin Mixed Mulford

### For the Treatment of Gonorrhea

Neisser Serobacterin Mixed Mulford is prepared from a large number of strains of gonococci and other bacteria found in gonorrhea representing different types and varieties that produce corresponding antibodies, and is therefore polyvalent. The bacteria are sensitized with specific serum and repeatedly washed to free from all traces of uncombined serum.



Sensitization with Serum containing specific antibodies causes the bacteria to be promptly attacked by the complement resulting in an immediate immunizing response.

Neisser Serobacterin Mixed possesses the advantage of preattachment of the amoceptor to the bacterial protein and is therefore ready for the immediate action of complement in the patient's blood. It may be given in larger doses and at shorter intervals than the unsensitized bacterins, thus facilitating rapidity of immunizing response.

Sensitization decreases clinical and opsonic negative phase since the bacteria can not absorb any of those present in the body.

The doses are repeated at intervals of 24 to 48 hours gradually increased as indicated. Should reactions occur in hypersensitive individuals smaller doses should be used.

Neisser Serobacterin Mixed Mulford is supplied in packages of four aseptic glass syringes with sterile needles ready for immediate use and contains killed sensitized bacteria as follows:

	A	B	C	D
Gonococci	125	250	500	1000 million
Staphylococcus aureus	125	250	500	1000 million
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Streptococcus	125	250	500	1000 million
B. coli	125	250	500	1000 million
Diphtheroid bacilli	125	250	500	1000 million

Single syringe, D strength only.

No. 9—in 5 mil vials each mil strength of Syringe D.

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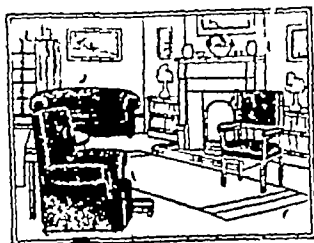
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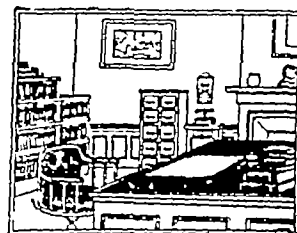
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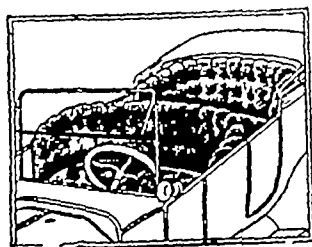
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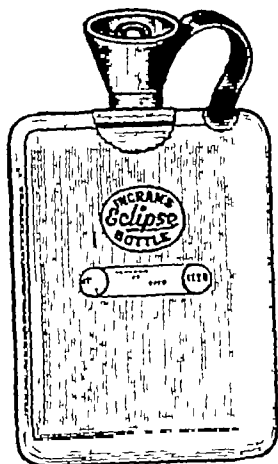
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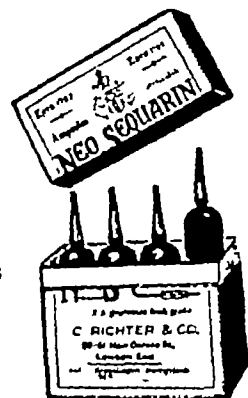
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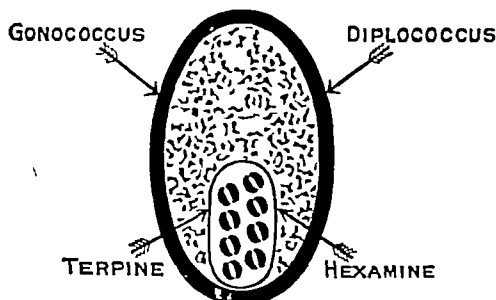
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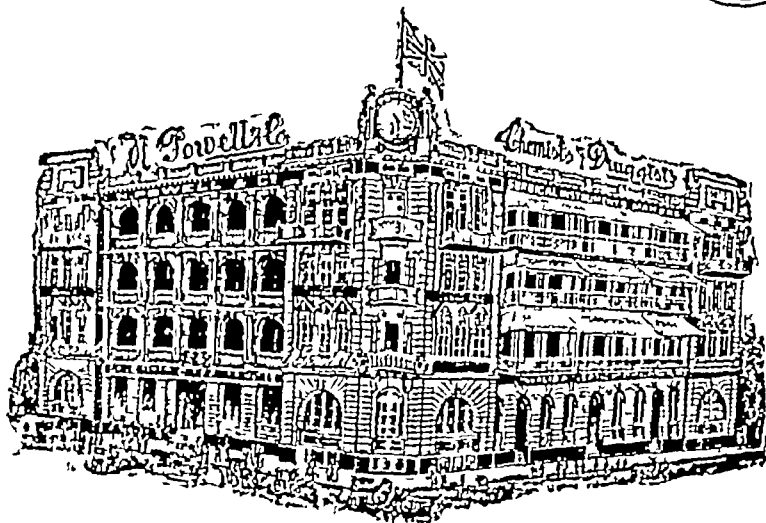
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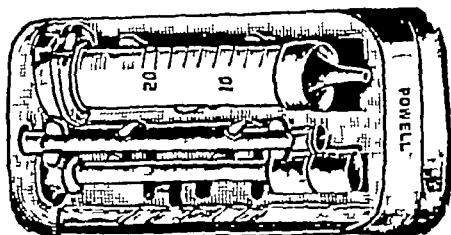


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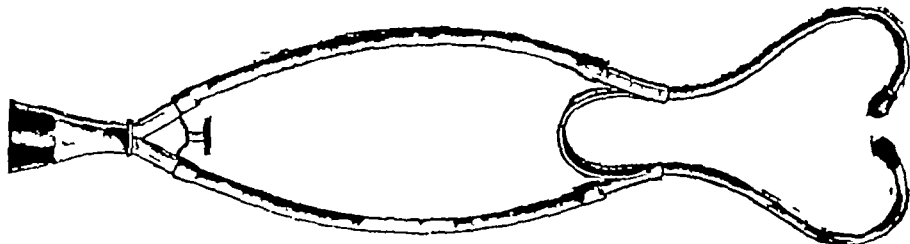
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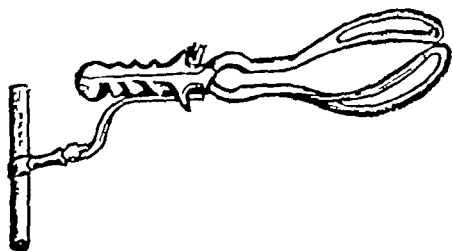
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**EYE CASES** Fig. 402, Eye Instrument Case containing all instruments in metal handles and the case being velvet lined.

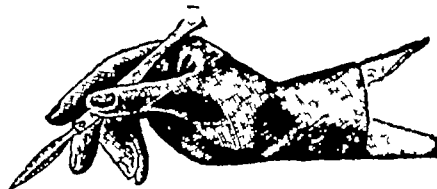
Fig. 402, Eye Instrument Case No 4  
Fig. 403, Eye Instruments in Morocco Case. All Instruments in metal handles.

Fig. 414, Set of Eye Instruments in Aseptic Metal handles and Metal case (N P) with movable racks.

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The high cost of Platinum and consequent prohibitive cost of Platino Cyanide Screens has led us to develop a new screen for Fluoroscopy possessing the advantage of supersensitiveness to waves of short wave lengths (X-Rays)

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Perfect definition and contrast complete absence of after phosphorescence (persistence of image)

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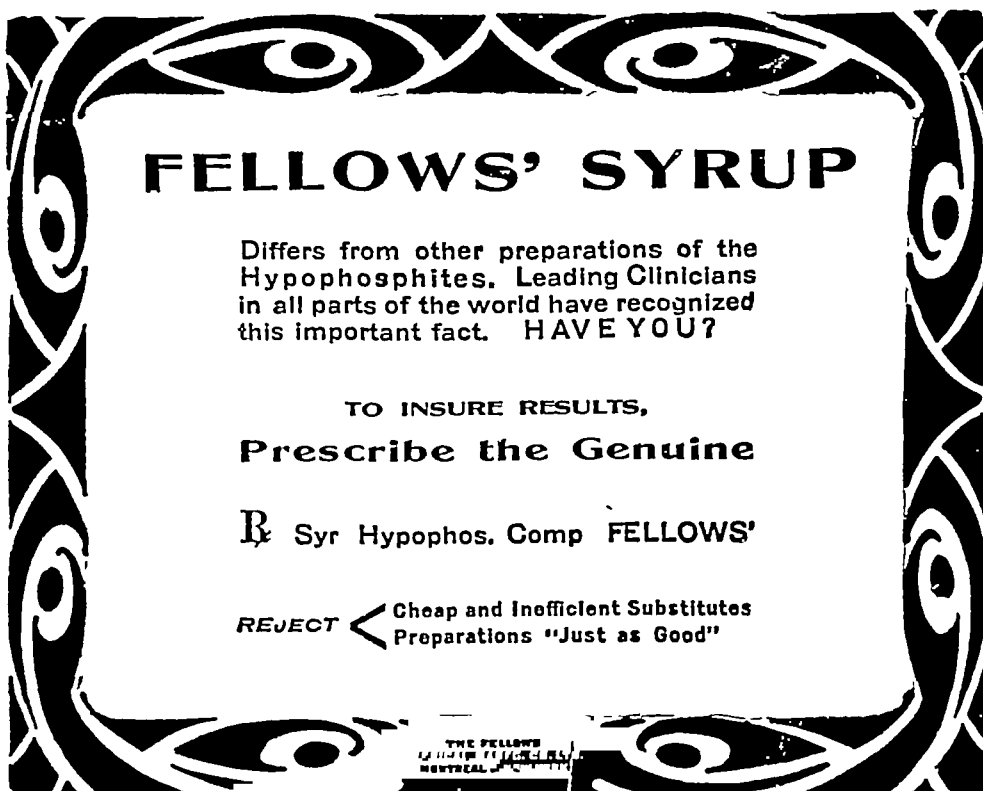
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*Supplied in Bulk and Bottles.*

The following are genuine unsolicited testimonials from people of repute. Names are omitted but the originals will always be produced

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'Since writing you last I have had a bad case of Chronic Suppuration of the Antrum of Highmore—many years standing—I operated upon it on March 24th, cavity was filled with foul smelling discharge and polypi which extended to the nose and of the worst kind. After cleansing out all the diseased tissue I had it dressed with gauze soaked in MILTON twice daily, a weak solution at first, the ordinary syringing being carried out first. These cases, as a rule, continue to discharge and stink for months after—not so this one—the smell diminished the first day and to-day (10 days) there was no smell or discharge."

**AUXILIARY MILITARY HOSPITAL, FRODSHAM, CHESHIRE, 9th August, 1917—Messrs Milton Manufacturing Co., Ltd, John Milton House, 125, Bunhill Row, E.C.**

DEAR SIRS—Will you please forward 8 gallons of MILTON. We have had very good results from the use of this fluid.—Yours faithfully, (Signed)

**EXTRACT FROM LETTER FROM A DENTAL SURGEON,  
Rodney Street, Liverpool, 23rd August, 1917**

"I wish I could give you as good a report of Milton as it deserves, for I find, as a germicide, and for cleaning up a "foul mouth," it is the best thing I have ever tried, for it acts almost instantaneously and does not irritate the mouth. I have also tried it for Pyorrhœa and other suppurating troubles of the mouth, and it has been splendid because of its strength without the irritation of nearly all other germicides which we use for Pyorrhœa. I constantly use it, and shall continue to do so."

From—Officer in Charge Supplies  
To—Officer Commanding

T/11 August 25th, 1917

*Milton's Fluid*

Reference to the marginally noted disinfectant I have to inform you that while Mr Smith, the manufacturers representative, was here, he not only demonstrated this preparation to me, but I also made a test of the same for our own satisfaction.

This test consisted of spraying a piece of beef with the solution and leaving the same outside in the sun, the idea being to see the result from flies.

The meat remained in the open air seventy hours before it became fly blown and it is doubtful in my mind if there would have been fly blows at that time, had it not rained the previous night. The rain, no doubt, washed off the solution, but even at that, though the fly blows were in a tissue pocket, and the meat had become dark in colour, externally only, due to having been seared from the sun's heat, when cut open was very fresh in both colour and smell, and was quite edible.

If the present intention to issue freshly killed beef is to be put in operation this solution will be invaluable to me. I have had no occasion to use the solution on frozen meat only having used the preparation as a straight disinfectant in the butchery where I find it certainly purifies the air, and takes away any odour there may be.

I find it very good for removing the odour arising when mutton has been hanging any length of time.

To—Major , London

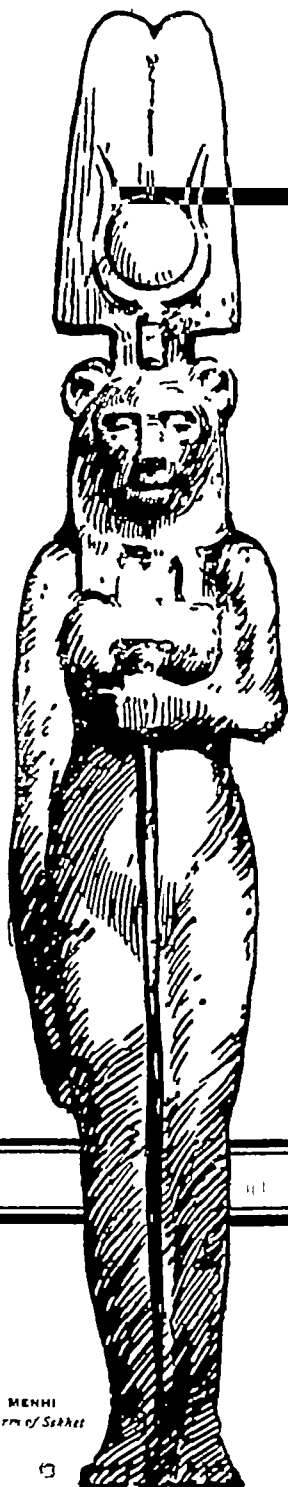
*Personal*

Remarks by the Supply Officer above in connection with the test made of Milton at the Supply Depot of this Station are forwarded please. I might mention what I saw of one or two demonstrations made by Mr Smith, it could be used to a very great advantage for many purposes both in the Supplies and the Transport Sections of the C. A. S. C. It is by far the best disinfectant I have as yet seen and in view of the fact that fresh meat issues are about to be made, the butchers shop is going to be not very far short of a slaughter house, and as a disinfectant and fly exterminator for this particular purpose I would strongly recommend the purchase of Milton in this connection.

MILTON MANUFACTURING CO. LTD., LONDON, GLASGOW, MANCHESTER AND DUBLIN.

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Always heat in the original container by placing in hot water. Needless exposure to the air impairs its osmotic properties, on which its therapeutic action largely depends.

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Do Do	6 gr.	"	1 4 0
Strychnine Hydrochlor	1/100 gr	"	1 0 0
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Ergotine Citras	1/100 gr	"	1 8 0
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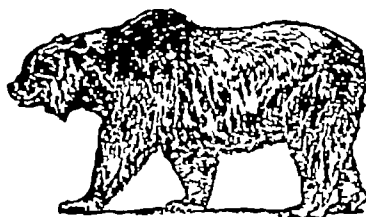


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## Original Articles.

### STANDARD DIETS

By J. A. SHORTEN,

MAJOR, I.M.S.

(A lecture delivered at the Calcutta Health and Child Welfare Exhibition)

THE subject on which I have been requested to address you this evening is one the importance of which can scarcely be over-estimated. The question of the most suitable diet for human beings has engrossed scientists, and I might add cranks and quacks, throughout the ages. It will be obvious to all of you who live in India, or have travelled abroad, that human beings can live and flourish on many different types of diet and foodstuffs. The diet of the Hindu is not that of the Mohamedan, and the diet of the European is different from both. Yet all three flourish side by side in India. It is obvious, however, that there must be some common basis, for physiologically there is very little difference between individuals of different races. It is to this basis that I wish to direct your attention this evening.

The subject of a standard balanced diet has formed the ground for much controversy. Books and pamphlets on dietetics have been written and are being written *ad nauseam*. Those who believe in our ultimate descent from monkeys point to our dentition and say man was meant to be a vegetarian. Others, noting the superior development and predominance of the meat-eating races, hold that the development of the human race began when man became a hunter and, so to speak, tasted blood. Each view may be right in its own way, but the fact remains that man is an omnivorous animal and flourishes best as such. In seeking for a properly balanced diet we must start from this assumption. I do not propose, however, to discuss the various theories of cranks and faddists, but to confine myself to well-established facts,—facts which are capable of experimental proof.

Until a few years ago physiologists and physicians were satisfied that bed-rock had been reached in the matter of diets. Quite recently, however, new facts have come to light. The Great World War which brought misery to thousands has been the means of shedding light on many medical and hygienic problems. The question of an adequate and well-balanced diet is not the least of these. Among other things that the war taught us is the fact that most of us who are fairly well to do can live on much less than we usually eat, in fact, we should feel better and be better with less food. In England during the war many essential foodstuffs such as butter, meat, milk, and sugar were of necessity reduced to a minimum, and people generally did not seem to suffer in consequence.

The minimum, however, is not necessarily the optimum. We must remember that we are not delicately balanced mechanisms but living beings,—our powers of adjustment are almost unlimited. A speck of dust will stop the delicate movements of a watch, but it would take many specks of dust to stop beating of the human heart. The recent dismal mechanistic physiology, to quote Bayliss, is passing away and is being to some extent replaced by the ancient ideas of vital force.

To return to the elucidation of the problem before us let us ask ourselves what is the purpose of food. In this connection Professor Bayliss, the eminent physiologist, writes—

"The purpose of food is two-fold—on the one hand, to serve as material out of which the structures of the body are produced, and, on the other hand, to afford the energy required for muscular work by being burnt up and oxidised." Food, as it were, on the one hand, goes into the walls of the human edifice, and on the other hand into the fire on the human hearth. Food is used for constructive purposes chiefly in the young and growing animal. The amount required to replace ordinary wear and tear of the active tissues is very minute. So that the greater part of the food of adults is used to supply the human engine with fuel.

Theoretically any combustible substance that can be digested and absorbed may serve as a source of energy, but practically our choice is very limited. Petroleum, for instance, when burnt in an internal combustion engine is capable of yielding an enormous amount of energy, but it is perfectly useless as food.

There are three classes of chemical compounds available as foodstuffs, *viz*, protein, fats, and carbohydrates. Examples of proteins are egg white, meat, etc., of fats, butter and suet, and of carbohydrates, sugar, starch, flour, etc. It is found that certain minimum quantities of each of these foodstuffs are necessary to maintain the body in an equilibrium of material and energy. But these are not sufficient for the maintenance of perfect health. We require in addition water and certain mineral salts, such as chlorides and phosphates of sodium and potassium.

These five substances, proteins, fats, carbohydrates, water, and salts, are usually referred to as the proximate principles of food. Until recently these five proximate principles were, with the oxygen we take in through our lungs, considered all-sufficient for the maintenance of life and perfect health. It is now recognised, however, that certain other substances, called accessory food factors, are necessary. The absence of these for any length of time will lead to one of the so-called deficiency diseases. Of these accessory food factors one is called *fat soluble "A,"*—a substance which is found in animal fats such as butter and suet, and also in certain of the leafy vegetables and grasses, but not in vegetable oils or fats such as go to make margarine. This substance is necessary

for the growth and development of young animals. Young rats, for instance, fail to grow and eventually die if fed on a diet from which this substance is eliminated. The importance of this discovery in considering the diet of infants and young children is self-evident. The second accessory food factor is called *water soluble "B"* since it is soluble in water. This substance is widely distributed in the vegetable kingdom, being found in abundance in the wheat-germ and yeast. It is also present in certain animal substances, such as yolk of egg. It appears to be necessary to prevent the development of beri-beri. Fat soluble "A" has recently been shown by Mellanby to be identical with a substance which prevents rickets. In addition to these two groups of substances there is a third which prevents scurvy. According to our present knowledge, then, the substances which go to make up an adequate diet are —

- 1 Proteins
- 2 Fats
- 3 Carbohydrates
- 4 Water
- 5 Salts
- 6 Accessory food factors, of which we know three — Fat soluble "A," water soluble "B," and the antiscorbutic factor

The characters of a suitable and healthy diet may be summed up as follows —

(1) It must contain the proper amount and proportions of the various proximate principles.

(2) It must be adapted to the age and weight of the individual, the amount of work he performs, and the climate.

(3) The proximate principles must be present in a digestible form. For instance, peas and beans contain a large percentage of protein, but in an indigestible form, and, therefore, are not as good a source of protein as meat.

In order to arrive at a standard diet physiologists in the past have been at pains to strike a balance between the amount of nutriment ingested and the amount excreted in various ways. The two most important chemical substances concerned are carbon and nitrogen. It has been found that a healthy man eliminates 250–280 grms of carbon and 15–18 grms of nitrogen daily. These must be replaced by carbon and nitrogen in the food. Now, chemistry tells us that the main source of carbon is the carbohydrates, and that of nitrogen the proteins. Hence the great importance of these two foodstuffs or proximate principles.

The value of diets is usually expressed in terms of their heat-value, that is, the amount of energy they can liberate as heat on complete oxidation. The unit of heat-value is the caloric, or the amount of heat required to raise the temperature of one kilogram of water by one degree centigrade.

It will be clear to all of you that the necessary amount of food will vary in proportion to the amount of work done. But even when we

are asleep energy is being used by the heart and other vital organs, and also to keep up the body temperature. This "basal metabolism," as it is called, has been calculated at 1,700 calories per day for a man of 11 stones. If we then add on to this the amount required for various types of work we arrive at a basis for a standard diet. For instance, a tailor, doing light work, would require about 2,500 calories per diem, a metal worker 3,800, and a wood sawyer 5,500.

To give a concrete meaning to these figures Professor Bayliss gives the amounts of various foodstuffs required to furnish 100 calories roughly as follows —

Butter	$\frac{1}{2}$ oz	(13.5 gms)
Cheddar cheese	$\frac{3}{4}$ oz	(22 gms)
Sugar	$\frac{3}{4}$ oz	(24.5 gms)
Oatmeal	1 oz	(28 gms)
Mutton	1 oz	(29 gms)
Fish	$2\frac{1}{2}$ oz	(67 gms)
Eggs	$2\frac{1}{2}$ oz	(68 gms)
Milk	5 oz	(145 gms)

From figures such as these we can readily calculate the amount of different foodstuffs we require. We must, of course, always allow for food which may not be digested and utilised. An addition of 10 per cent is usually considered to be sufficient to cover this loss.

Working on the above lines various physiologists have arrived at certain standard diets, one of the best known of these classical diets is that of Ranke. It consists of —

Protein	100 gms
Fat	100 gms
Carbohydrates	250 gms

This diet has a heat-value of about 2,500 calories. Voit and others give more liberal diets.

The diet recommended by a Committee of the Royal Society, appointed during the late war to work out a diet for the nation, was as follows —

Protein	70 gms	280 calories
Fat	90 gms	810 calories
Carbohydrate	550 gms	2,200 calories
Total		3,290 calories

This diet is considered suitable for a man of 11 stones doing moderate work. It will be noted that it is somewhat poorer in protein and richer in carbohydrate than the classical diet mentioned above. Tables have been drawn up from which the total calorie value of a given diet can be calculated. Moreover, as Professor Bayliss points out, most of the complex articles of diet such as bread, potatoes, etc., contain a sufficient proportion of protein, — a fact which he has expressed in the aphorism, *Take care of the calories and the protein will take care of itself*.

We may now turn for a few moments to the different proximate principles and consider their use individually and their history in the metabolism of the body.

**Proteins**—As already pointed out, we require nitrogen to replace that eliminated in the excretions, and to build up the structural machinery of the body. This nitrogen we take in the form of protein. Now, protein is absorbed with difficulty from the intestinal canal. Hence the necessity for digestion. Protein is broken up into simpler substances by the digestive juices and is finally absorbed in the form of amino-acids. Part of the absorbed amino-acids are converted by the liver into urea, which is eventually excreted, and the rest pass on to be built into the tissues. Only a small moiety of the protein absorbed goes to supply energy. The amount of protein required is relatively small, as it depends on the amount of tissue waste to be repaired, and is not important as an energy-yielding food. The Royal Society Commission recommended a ration of 70 gms daily—part of which should come from animal sources. The majority of the classical standard diets include 100 gms or over.

High protein diets are condemned by various writers. Chittenden, for instance, as a result of experiments on students, soldiers and athletes, came to the conclusion that 30 to 50 gms of protein daily, according to the weight of the individual, is all that is needed. The period of observation, however, lasted only a few months, and it is clear now that he was deceived by some of the subjects of his experiments.

McCay calculated that the average Bengali metabolises only 37.5 gms of protein,—a figure which closely approximates those of Chittenden,—and maintains health thereon. But on the other hand he draws attention to the marked physical inferiority of the Bengali when compared with meat-eating races living under similar conditions, and the great prevalence of renal diseases amongst them.

Our instinctive appetites lead us when possible to adopt a diet with a high protein content, and it would seem to be only reasonable to encourage a certain margin of safety. The Roast Beef of Old England is a phrase which may have more in it than meets the eye, as the Boche found to his cost.

Before leaving the subject of proteins a reference must be made to the so-called purin-free diets, the advocates of which claim so much. The best known of the purin bodies is uric acid, a substance which is probably the most maligned of all chemical compounds. Half the ills to which human flesh is heir are attributed to it. Purin bodies form components of the nuclei of the cells of the body, and are normally excreted in small amounts. Excess of uric acid is undoubtedly associated with gout, but there is no proof apart from this that the group possesses any particular toxic properties. It is interesting to note that caffeine, the chief alkaloid of coffee and tea, and theobromine, the active principle of cocoa, are closely related to the purin bodies. You will

be pleased to know, however, that the balance of scientific opinion is against advocates of this fantastic diet, and you may continue to enjoy your tea, coffee and cocoa without fear of the dire evils which they say will befall you.

**Carbohydrates**—These can be dismissed in a few words. They form the chief source of our supply of energy. Since they contain no nitrogen they have little to do with tissue growth or repair. The chief carbohydrates taken as food are starch, cane-sugar, milk-sugar, maltose and glucose (in fruit, etc.). They must all be converted into glucose, or some simple sugar of the same group, before absorption. This change is chiefly brought about by the saliva. Hence the importance of properly chewing starchy foods. After absorption they are partly stored in the liver as glycogen, and the rest is passed on to the tissues, especially the muscles, where it forms the main source of the energy required for muscular contraction. Carbohydrates, therefore, are of great importance to those who undergo prolonged or severe muscular exercise, such as is involved in mountain climbing and marching. On the other hand, excess of carbohydrates, such as sweetmeats, is liable, in the indolent, to lead to failure of the mechanism for digesting and utilising them, and eventually to diabetes, as has been shown by McCay and his collaborators.

**Fats**—As already mentioned, both proteins and carbohydrates are absolutely necessary constituents of our food on account of the necessity of replacing the nitrogen and carbon lost in the excreta. The same cannot be said of fats, except in so far as they serve as a vehicle for the fat soluble vitamins. Fat is formed from carbohydrate in the body. In fact, the excess of carbohydrate ingested is up to a certain limit laid down in the body as fat. The digestive juices split fat into fatty acids and glycerine, which are recombined as they pass into the lymphatics, so that the absorbed fat eventually appears in the blood in the form of fine droplets.

Fat is a very concentrated form of energy-giving food, yielding 9 calories per gram as compared with 4 calories per gram each in the case of proteins and carbohydrates. The Royal Society recommended that 28 per cent of the total calories of a diet should be in the form of fat.

**Salts**—No special provision need be made for salts. They are present in many of the usual articles of diet, such as fruits, vegetables, and salads.

**Water**—The necessary supply of water is regulated by the feeling of thirst. Neither water nor salts afford energy, but, as Bayliss expresses it, they are necessary in the same sense as lubricating oil is to a motor.

**Accessory food-factors**—The fat soluble "A" factor is necessary to ensure growth—particularly in children and in adults recovering from wasting diseases. It is, therefore, important

that growing children should have a plentiful supply of fresh milk, butter and eggs. In the absence of these, codliver oil may be given as a substitute or as a medicine.

As regards the water soluble "B" factor, this, as already mentioned, is widely distributed in the common articles of diet. Danger arises, however, from a one-sided diet, as when polished rice, or white bread forms the staple diet. This vitamine is concentrated in the outer layers of the grain, and this is the part removed by the process of milling. The seed-germ, too, which contains a large proportion of the vitamine, is removed by the same process. The importance of unpolished rice and whole meal bread to a community living mainly on these foodstuffs cannot, therefore, be over-estimated.

*The anti-scorbutic factor*—This is a recent discovery, although scurvy is one of the oldest of the recognised human diseases. It has long been recognised that fresh fruit and vegetables are necessary to prevent the appearance of this disease among bodies of men such as sailors and troops. The classical Treatise on Scurvy, by James Lind, published 150 years ago, gives an excellent account of this disease and the use of fresh vegetables and fruit in its prevention.

The recent researches of Harriet Chick and Margaret Hume have added greatly to our knowledge of anti-scorbutic vitamins. Working with guinea-pigs, which readily develop scurvy on a basal diet of grain and water, these authors investigated the preventive effects of the addition to the basal diet of (1) fresh and dried vegetables, (2) fresh fruit juices, pulses soaked and germinated, (3) milk, (4) meat.

Their results and those of various American investigators go to show —

(1) The protective power of small quantities of fresh vegetables.

(2) Vegetables dried at high temperatures have no anti-scorbutic properties, but if dried at low temperatures they retain an appreciable amount of this virtue.

In this connexion, in conjunction with Dr Charubrata Ray, I have recently been able to demonstrate that certain of the sun-dried vegetables from Quetta, which correspond to the "low-dried" factory product, also retain considerable anti-scorbutic powers, those specially active being sun-dried tomatoes, potatoes and cabbage.

(3) Fresh lime juice protects, but stale or artificial products are useless.

(4) Fresh milk has considerable power, but if subjected to prolonged boiling or heated to 120 degrees C, it loses its power of protection.

(5) Fresh meat has some preventive properties, but they are not so marked as in vegetables, etc.

Among other facts demonstrated by various research workers is the fact that ordinary boiling of vegetables does not diminish to any great extent their anti-scorbutic properties, but if

the boiling is prolonged, or if alkalies such as bicarbonate of soda are added to the water, the vitamine is quickly destroyed. Prolonged cooking such as that involved in the hay-box method of cooking, in vogue during the war, is thus unsuitable for any substances of anti-scorbutic value (fruit and vegetables).

It also follows that tinned rations, vegetable or otherwise, which have been raised to 120 degrees C in the process of manufacture, are devoid of anti-scorbutic properties.

One of the most important discoveries made by Chick and Hume is that although dried pulses have no anti-scorbutic properties, if moistened and allowed to germinate, the anti-scorbutic elements re-appear in 48 hours, and that such freshly germinated material may be cooked for from 1 to 1½ hours without destroying the anti-scorbutic vitamins.

In conclusion you will naturally ask—How can the layman apply all these principles in daily practice? A few simple diet rules will best answer this question. These are —

1 Avoid a one-sided diet, remembering that you require proteins, fats, carbohydrates, and accessory food factors.

2 As good digestion is said to follow appetite, have your food cooked to satisfy your tastes and desires.

3 In the case of children, remember the importance of fat soluble "A" and give fresh milk, butter and eggs. Fresh orange or lime juice should also be given daily to prevent the possible development of scurvy.

The question of fresh milk is a difficult one on account of the danger of infection by enteric germs, cholera, etc. But if you can't keep your own cows it will be possible for many to keep goats which can be milked under your personal supervision. If you can't do either, remember the value of codliver oil.

4 Remember the value of whole meal flour and unpolished rice when flour and rice form the main articles of your dietary.

5 Remember the anti-scorbutic value of fresh vegetables and fruits. As regards the danger of cholera or typhoid, fruits the skin of which can be removed, such as oranges and plantains, are always safe. Fresh vegetables such as salads can be made safe by simply scalding in boiling water or using some simple disinfectant such as Condy's fluid.

6 Lastly, do not boil your vegetables for too long a time and, above all, do not add soda to soften them.

These few simple rules sum up all the most recent knowledge on the subject of diets.

## TYPHUS AND TYPHUS-LIKE FEVERS IN BIRJAND, EAST PERSIA

By A. S. FRY,

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TYPHUS FEVER has been met with frequently by the Medical Services in the northern part

of East Persia, both amongst the inhabitants and amongst our own troops. The Russians in Transcaspia have suffered heavily from the epidemic disease.

The following notes were gathered from nine cases of typhus or typhus-like fever which were met with in Birjand during 18 months of hospital experience amongst the garrison of troops stationed there. Six of these cases were admitted to hospital during May and the last few days of April, 1919. One case occurred in the middle of June, and the other two during the first three days of July, 1919.

*Case 1*—The first admission was a young Indian clerk of the Works Department, on April 24th, complaining of fever since the previous day, severe headache and backache. There were no physical signs to note other than a furred tongue. The blood was negative for malarial parasites and for spirilla. The following evening the blood was again examined without result. On the fourth day of the disease the tongue was very red and fissured. The throat was congested and the uvula oedematous. There were no head symptoms or signs. On the fifth day the patient declared that he felt better, and the pain in the head and back was less. A few red spots, which faded on pressure, were observed over both arms and on the trunk. The patient was promptly isolated under suspicion of suffering from fever of the enteric group. On the sixth day the rash was well developed, especially over the back of the trunk and on the flexor aspects of the limbs. There was tenderness on palpation over the right costal margin, but no enlargement of the liver or spleen. On the seventh day the rash was fully developed all over the body, including a few spots on the face. Headache persisted, he did not complain of backache. The spots were pin-coloured, perceptible to the finger, and faded on pressure. They varied in size from typhoid-like spots to circular macules  $\frac{1}{4}$  in diameter. On the ninth day signs of congestion were present at the bases of the lungs. On the tenth day the rash began to fade. The patient was listless and drowsy, and the pulmonary congestion gave rise to anxiety.

On the thirteenth day the patient passed his motions involuntarily in bed. On the sixteenth day the motions contained blood and mucus. The general condition was slightly better, as the incontinence of faeces did not continue. A starch, bismuth and opium enema was administered. The stool was subjected to microscopical examination, but no amœbæ were found. On the seventeenth day the rash had almost entirely faded, leaving a few brownish stains which disappeared in the course of the next ten days. No petechiæ were present. On the eighteenth day eight doses of magnesium sulphate were given—drachms two every two hours. This had no effect on the colitis. On the twenty-first day emetine hydrochloride gr  $\frac{1}{2}$  was given hypodermically morning and evening,

and repeated daily twice until twenty such doses had been given. On the twenty-second day the lungs were normal. The tongue was moist and covered with flakes of sticky, white coating. The stools daily consisted mostly of blood and mucus. On the twenty-eighth day a small, punched-out bed sore formed over the sacrum. The tongue was clean. The colitis continued. On the twenty-ninth day he passed the first stool without blood or mucus since the onset of the colitis, but in the evening the stool contained a little blood. The next day the stools were free from blood and mucus, and of watery consistence. On the thirty-sixth day the motions became soft, semi-formed, yellow in colour, but still rather frequent. On the forty-second day the stools became finally normal in frequency and consistence.

The bedsores healed slowly during the course of the next month. The patient, who had been much reduced by the illness, slowly regained his strength and weight. No bands of conjunctival congestion were noted as have been described in typhus fever, but there was a certain degree of bulbar congestion under cover of the lids. Towards the end of the fever and during the first few days of convalescence the patient displayed a weakness in protruding the tongue, which was tremulous, and inability to protrude that organ fully. On 19th July he was discharged from Hospital, fit and well-nourished. He was ordered a fortnight's rest before he resumed his clerical duties. Eighteen days later he died after an operation at which a gangrenous appendix and retro-cæcal abscess were found. It is interesting that a blood-count performed before the operation showed a polymorph percentage of only 70.5, which leads one to speculate as to the possible connection of this late complication with the early dysenteric lesions.

*Cases 2, 3, and 4*—On April 27th, a private follower of certain clerks of the Audit Department was admitted to hospital with fever. Three days later one of his masters was admitted with the same complaint, and on May 4th his other master, who was the father of the young lad whose case has been described, also succumbed.

All four men were fair-skinned. In all four cases the rash was similar, profuse, well marked and never petechial. The spots were most numerous on the trunk and upper arms, the face, if affected, showed only a few spots. A few spots appeared on the fifth or sixth day of the fever, the rash was fully developed on the third or fourth day of its appearance and then faded gradually until about seven to ten days later brownish stains were left which slowly disappeared without any marked desquamation. The watercourse appearance was not observed except in one case where there was a very faint mottling of the skin of the back on the day of the appearance of the rash.



In other respects these three cases resembled clinically that already described, except that bedsores and colitis complications were absent. The prostration was not so marked, nor was the tongue sign present except during the last two days of the fatal case. The patient might feel out of sorts for one day before the fever became evident to him. The general symptoms of fever were present—febrile aches and pains, headache—not so marked as in relapsing fever—and backache. Pulmonary congestion, as evidenced by crepitations and rhonchi heard over the bases of the lungs, appeared in each case from the third to the sixth day after the appearance of the rash, clearing up in about a fortnight in the three cases which recovered. The liver edge was noted as tender in the first case described, and the organ was slightly enlarged during the height of the fever in another case which recovered. No splenic changes were noted. In each case there was some degree of looseness of the bowels both during the fever and also during the first week or two of convalescence.

The two clerks made a rapid and complete convalescence. The private follower died. He was a well-nourished man admitted on the second day of fever. The rash developed on the sixth day. The next day he had slight epistaxis from the right nostril. On the ninth day the rash was fully developed and very profuse, being the most marked of the four, although the face was not affected. A brownish tinge was noted on the white-coated tongue. Pulmonary congestion developed on this day. On the thirteenth day he was doing excellently well and gave cause for no anxiety. Morphia hypodermics had been given for sleeplessness, and the effect, carefully noted, gave no contraindication to its use. On the fourteenth day, however, the patient was found to be apathetic, and was induced to take his nourishment with some difficulty. The pulse was good, there was no delirium, but the tongue was rather dry and crusted. On the morning of the fifteenth day he suddenly collapsed, and his sunken eyes and pinched features presented a remarkable change from his appearance on the previous day. Towards noon he passed into a condition of unconsciousness and died at 2-35 P.M.

The blood was examined in all cases several times and no spirilla or malarial parasites were found.

*Case 5*—The fifth case I submit as an example of mild, abortive typhus. The patient was a clerk from the same office as the other two audit clerks. He was admitted to hospital on May 9th, on the second day of fever. The blood was examined on the morning and evening of this day—no malarial parasites or spirilla were found. The patient was well nourished and had no symptoms at all throughout the fever except anorexia which persisted during the first three days of convalescence. The

spleen did not enlarge. On the fourth day a general blushing of the skin over the body and limbs was noted, and two pink spots were observed on the left upper arm. A few crepitations were audible over the base of the left lung. The next day the spots and erythema had disappeared and the lungs were clear. This patient was also fair-skinned. He made a rapid and complete convalescence.

*Case 6*—My next two cases were dark-skinned natives of South India. My private bearer was admitted to hospital on May 30th, on the third day of fever. The blood was examined on the third, fourth and ninth days without result. The fever commenced with a rigor and vomiting. On admission he complained of frontal headache, pain in the epigastrium and vomiting. The tongue was moist and coated with a brownish fur. The patient rapidly became extremely prostrated with a dry, brown, crusted tongue on the ninth day, which he was unable to protrude beyond the lips. The spleen was enlarged slightly but not palpable. No rash was observed and no lung signs, but the latter were not sought for too eagerly owing to the dangerous condition of the patient. After the first week of convalescence he emerged from his critical state and commenced to improve steadily. He made a complete recovery. This man had been inoculated with two doses of T. A. B. vaccine twelve months previously.

*Case 7*—The other patient was a sepoy from the station garrison admitted on June 17th, on the third day of fever. The blood was examined four times without result. No rash was seen. Rapid prostration was marked. The tongue quickly became dry, and when the patient tried to protrude it, the tip caught on the lower incisors and the tongue was not protruded beyond the lips. This sign was well marked on the twelfth day and persisted up to the eighteenth day, when the tongue became moist and thickly coated with yellowish fur. There was diarrhoea during the early part of the illness and also during the secondary fever, the stools being of pea-soup colour and consistency. Pulmonary congestion appeared on the sixth day and on the eighth day the lungs were full of rhonchi and bubbling râles. From the ninth to the eleventh day the pulse was dicrotic, thereafter the blood pressure improved. On the twentieth day the patient, although very debilitated, appeared to be mending. The lungs were clear, the moist tongue, still thickly coated, with clean tip and edges, could be well protruded. The next day, however, a secondary fever supervened. On the twenty-fifth day the fur on the tongue assumed a brownish tinge. There was tenderness in both hypochondriac regions, but neither spleen nor liver was palpable. The blood showed leucopenia.

On the twenty-seventh day the heart assumed a fetal rhythm. The base of the right lung was dull on percussion, and the breath sounds diminished, there were no accompaniments.

The patient gradually sank from exhaustion, the fetal heart rhythm persisting. Three days before death a few fine crepitations were audible over the bases of the lungs, so that this secondary fever probably denoted a low form of pulmonary inflammation which resulted in death about noon on the thirty-fourth day.

*Cases 8 and 9*—The last two cases were two Persians from the Seistan Levy Corps admitted on the first and third days of July respectively. They had white skins, but their rashes were not nearly so marked as in the first four cases. Both were well-nourished men and did not appear to suffer much from the effects of the illness, as both were clamouring for release from hospital within a week of the subsidence of the fever. The symptoms consisted of febrile aches and pains and mild frontal headache. The blood, examined several times, was negative for malarial parasites and spirilla. Only one showed inability to protrude the tongue, this sign occurring from the ninth to the eleventh day. Both had well-marked enlargement of the spleen during the fever, and one had slight enlargement of the liver. Signs of pulmonary congestion absent in one case, were present in the other on the sixth day, when slight hæmoptysis occurred. The rash appeared on the fifth day in one and on the eighth day in the other. In both it consisted of a mottled erythema and pink erythematous spots over the trunk and upper arms, appearing together. The spots, which did not become petechial, commenced to fade on the second to third day after appearance, and the mottling was the last element to vanish on the fifth to seventh day of the rash, leaving no desquamation or pigmentation.

*Case 10*—I had one more case, which was returned as fever of the enteric group, but to my mind resembled much more the fevers I have described. This was a sepoy of the Station Garrison admitted to hospital on August 5th, on the second day of fever. He was dark-skinned and no rash was observed. On admission he complained of slight headache, severe backache and pain over the front of the chest. The tongue was rather dry and lightly coated. The spleen was enlarged, but not palpable owing to the rigidity of the abdominal muscles. There was tenderness on palpation in the right hypochondrium. Signs of pulmonary congestion were present, there was diarrhœa with "pea-soup" stools. Blood examinations were negative. On the seventh day the spleen was palpable at the costal margin and did not enlarge further. On the ninth day the patient presented the prostrated condition of typhus, the tongue was dry and covered with innumerable cracks, its margin was red and raw, it could not be protruded beyond the lips owing to the tip catching on the lower incisors. There was no delirium, but the patient was very weak and had wasted considerably. The motions were watery, brown-coloured, and contained flakes of mucus tinged

with blood. The pulse was small and not dicrotic. The spleen was palpable at the costal margin, and liver edge palpable and tender. There was no jaundice and no distension of the abdomen. On the fourteenth day the diarrhœa ceased and the patient felt much better. There was still some lung congestion.

On the fifteenth day the spleen had receded under the costal margin and the liver edge was not palpable, although there was still tenderness on palpation in the right hypochondrium. A small, hard, tender swelling was noticed in relation to the under surface of the left lower jaw near the angle. This increased in size towards the middle line. A carious lower molar was extracted from the left side on the sixteenth day, but no pus was obtained. On the twenty-first day the abscess burst into the mouth, *via* the socket of the extracted tooth, and about 2 oz of foul, greenish-yellow pus was expectorated. By this time the lungs were clear, but the tenderness over the right costal margin remained. On the twenty-third day the wound in the neck commenced to discharge greenish-yellow pus, gradually a large slough separated. The wound cleaned and granulated, the patient put on weight and convalesced slowly. During the first four days of October he had a recurrence of diarrhœa, the motions containing large masses of mucus without blood. This responded immediately to a course of mag. sulph. The septic complication was, I consider, due to periostitis of the lower jaw. When the patient was transferred down the line towards the end of October he was fairly fit, the liver and spleen were normal.

Among these ten cases there were two deaths. The case of mild typhus was fit for duty after three weeks in hospital. The first admitted case was three months in hospital. The remainder, with the exception of the last case described, were fit for duty within two months of onset. My bearer has been in the best of health since his illness, and distinguishes himself on the football field by his zeal and agility. The clerks are fine specimens of their class and would do credit, in appearance at any rate, to any office.

In the fever charts I think that I could trace some similarity. The febrile course may be divided into two parts: the first part consisting of a more or less continued pyrexia, the second part of a lower, irregular fever tending to remittent or intermittent type, the two parts being separated by a break of pseudo-crisis or pseudo-lysis. Cases 1, 4, 6, 7, 8 and 9 show this feature most distinctly, the break occurring from the 8th to the 11th day. In cases 8 and 9 the second part of the fever is partially suppressed, which was in keeping with the mildness of the cases and the ill-marked rash as compared with the first four cases. Cases 2 and 3 do not show these features. Case 5, which appears to be an abortive form of this fever, shows a break on the eighth day with complete suppression of the terminal

fever In case 10 the terminal fever merges into the fever of the septic complication

## ON AN OUTBREAK OF RELAPSING FEVER IN TURKEY IN 1918

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TEL HADI

THE northern part of Mesopotamia, that is to say the country which lies between the rivers Tigris and Euphrates, consists for the most part of a very slightly undulating plain, crossed at long intervals by ranges of mountains—pimpled with extraordinary regularity by small roughly conical hills, some 100–200 feet high, called 'Tels'. This plain is watered by occasional streams and for two or three months in the spring is covered with a green herbage, which the advent of the hot weather about May changes to a brown dust. Towards the west this plain is populated by settled inhabitants who live in numerous villages, but to the east is uncultivated and inhabited only by wandering Bedouin tribes.

In this eastern part is a Tel called by the Bedouins who used to camp about there in the spring of each year 'Tel Hadi,' and this was the spot chosen for the headquarters of one of the sections of the Baghdad Railway construction, when it was decided, during the war, to continue building this railway from Nisibin to Mosul. The Baghdad Railway was being constructed before the war by a German engineering firm, and this construction was continued during the war, for the Turkish government, by German engineers, mostly working with prisoner-of-war labour. Construction was commenced simultaneously at various points along the route, and the whole of the line under construction was divided for administrative purposes into sections. Construction in the Tel Hadi section was begun at the end of 1917, the rail-head then being at Tel Helif, three days' journey to the west.

In April 1918, when the outbreak of relapsing fever began, the section consisted of a permanent headquarters and various camps of workers which changed their position as the work progressed. The workers mostly lived in tents, and those generally black Bedouin ones. The German engineers, and a few of the more important employees, had houses of stone and mud. There should have been a German doctor in medical charge of the section, but the one who was sent was killed in an attack made by the local Bedouins and never replaced, and in consequence from February onwards I had the medical arrangements in my hands.

The hospital was accommodated in two wooden 'baragues' and some stone houses and

tents. The arrangements were very makeshift and primitive, but we were lucky in having a good Leitz microscope and some stains.

Our cases were drawn from this comparatively isolated community of about 800 persons, of at least fifteen nationalities and speaking as many languages,—a circumstance which did not make it easy to obtain good histories from the patients.

The numbers were roughly —

<i>Cases of relapsing fever</i>		
British	38	1
Indians	404	8
Russians	28	10
Germans	7	1
Greeks	30	9
Armenians	25	6
Arabs	30	3
Jews	3	
Turks	150	16
Cherkas & Chichins	15	8
Roumanians	5	
Italian	1	
Kurds	30	1
Maroccans	5	1
Algerians	30	2

### CLIMATE AND BLOOD-SUCKING FAUNA

The weather in 1918 was cold and wet until April, and then mild until the 10th of May, when the hot weather began suddenly. In May and June temperatures up to 43 degrees C were recorded inside a stone room in the hospital.

Lice were extraordinarily prevalent throughout the winter, but diminished in numbers as the weather grew hot and the measures for dealing with them became more effectual. A sensible diminution began in June. Everyone was more or less infected with them, but specially the Turks and Russians. Mosquitoes, both culex and anopheles, were numerous from May onwards, and from June onwards we were troubled by a very minute sand-fly. I never saw a bedbug or a tick. Fleas were fairly numerous up to May.

The whole of the headquarters was overrun with mice, and flies were very numerous during the whole of the hot weather.

### THE OUTBREAK OF RELAPSING FEVER

Relapsing fever first made its appearance in April, 1918, and continued till June, and it is this outbreak an account of which I think is of some interest, as, so far as I know, it is the only outbreak described in this part of the world, and the results of treatment were extraordinarily satisfactory. There is no disease I know so satisfactory to the doctor. With a microscope the diagnosis is certain, and with meosalvarsan, and no doubt with other arsenobenzene compounds, the treatment is wonderfully successful.

The course of the epidemic is shown in the following table.

The diagnosis was in each case made microscopically and no case occurred which was clinically relapsing fever, in which, at some stage or other, the spirillum was not found.

## THE SPIRILLUM

*Method of staining*—In all cases thin blood films were examined, but I think perhaps a thick drop method would have been better as a routine procedure. The films were stained with Giemsa's stain and examined under 1-12 in oil immersion lens. The spirillum stains rather slowly to a dark purplish blue colour and loses its stain easily if washed with water containing a trace of acid. This point is of some importance as if—as sometimes happened—the Giemsa did not colour the red corpuscles a nice red one was tempted to improve the appearance of the slide by washing it for a moment in very dilute acid. Its appearance was wonderfully improved, and malarial parasites thereby more easily seen but the relapsing fever spirilla were apt to be lost in the process.

## APPEARANCE

The spirillum as thus seen was very variable. It varied in numbers found from none at all (and this after 15 minutes' search in a case in which it was subsequently found) to many in each field. The thickness varied from ones so thin as to be hardly visible to a coarse organism like a mouth spirochete, but in the same slide the thickness was fairly constant. Manson and Thornton who also noticed this variation, even suggest the possibility of there being two varieties of the Sp. Duttoni on the strength of it (13). Its length was about  $20\mu$  and without accurate measurements seemed to be one of its most constant features (26).

The flexures were open and very irregular and in some cases the parasite took the form of a segment of a circle (13). This was possibly a change occurring when the film dried.

The ends were pointed.

The parasites were always found in the blood during some part of the attacks of fever, and never in the intervals when the temperature was normal. Out of 25 cases examined on the first day of the first attack of fever in five cases they were not found, but in each of these cases were found on the second day. In one case only one spirillum was found on the first day after a long search, and several on the second day (5).

This is a strong indication that the parasites in the first attack reach their maximum number late in the attack rather than early.

I could not find that the number of parasites found in the blood bore any relation to the clinical severity of the disease.

The parasites did not appear to be more numerous at one time of day than another. They were always extracellular, no case of phagocytosis being observed. The injection of neosalvarsan into a vein caused their rapid disappearance from the blood.

Unfortunately owing to want of apparatus and material, attempts at culture of the organism in vitro, and serum reactions could not be tried.

## THE VECTOR

The ordinary vector is certainly the louse, (30), (32), (33), (35), except in Africa where it is a tick—the *Ornithodoros moubata*. The bed-bug can carry the disease (29), and mosquitoes have been thought sometimes to do so (49). No one has discovered a flea doing so (13), (47).

There were many indications that our outbreak was due to lice—

(1) The cases were most numerous amongst the sections of the community which were most infected with lice. No cases occurred amongst the hospital staff who were in daily contact with cases but had special facilities for keeping themselves free from lice. Very few cases occurred amongst the Indian prisoners of war, although these were more numerous than any other nationality. They kept themselves clean.

(2) Several times smears of crushed lice from relapsing fever cases were examined, and on one occasion an undoubted spirillum was found.

(3) There were no—or very few—bed-bugs or ticks, and sand-flies and mosquitoes did not make their appearance till the epidemic had started to decline. The disappearance of the disease corresponded with the disappearance of the lice.

(4) No cases of infection occurred so far as I could find in hospital. The patients were carefully de-loused on admission, but relapsing fever cases were in no way isolated from those suffering from other diseases (cf 47).

## MODE OF INFECTION

It is probable that infection takes place not so often from bites of an infected louse as from inoculation of a crushed louse into scratches made when the patient feels the irritation of the bite (1), (13).

## THE BREEDING OF THE PARASITE IN THE LOUSE

It is generally admitted that the organism breeds and is hereditary in the *Ornithodoros moubata* in Africa and this is probably the case in the louse elsewhere, but the findings of various observers are not quite consistent (23), (29), (31). Leishman (34) has reported a 'granule clump' formation by the spirillum in the *Ornithodoros moubata*, a sort of spore formation, and J Koch (29) a somewhat similar appearance in the louse.

## THE CLINICAL COURSE OF THE DISEASE

*The incubation period*—In this epidemic I had no indications of the length of the incubation period. It is usually given as from 2-10 days (11), (23), (47), but Manson and Thornton found about 7-14 days the usual time with variations from 2 to 17 (13).

## THE INFLUENCE OF SEX

In our epidemic only one case occurred in a woman to 65 in men, but this was nearly the proportion of women to men in the section.

Other observers agree that males are much more frequently attacked than females (1), (2), (47)

#### ONSET

The onset was always sudden, without premonitory symptoms, the temperature rising to 39–40 degrees C in about 12 hours. In the majority of cases the temperature rose in the evening or at night, and rigors were notably absent in distinction from malaria. The usual symptoms due to fever were observed. When first seen, usually on the first or second day, the patients had a peculiar lethargic manner. They were very docile, and rather slow in their movements, and seemed as if weighed down by terrible trouble. They did not (as was often the case with other diseases) try to impress the doctor by the seriousness of their illness. I thought their manner rather characteristic, and that I could usually decide if a patient had this disease or not when he first walked into hospital. I have since found that other observers have noticed a similar manner (13), and Bertier in Serbia (11) and Van Hoof in Africa (3) consider it characteristic. Portcalle in Salonika (4) notes a curious cry, as in meningitis, but with us this symptom was not present. This observer also notes that Kernig's sign often occurs.

#### HEADACHE

Headache was invariably present, and perhaps, as various observers think (4), (9), more severe than one would expect to be associated with the rise in temperature.

#### DELIRIUM

Delirium was only present in the one fatal case, and then only late in the attack, and of the low muttering type. This symptom appears to have varied much in different outbreaks. Some observers (16) consider early delirium an important diagnostic sign. While others (4), (17) are aided in diagnosing their cases by the absence of it.

#### THE TONGUE AND BOWELS

The tongue was usually furred and moist and seldom the dark brown, dry, furred tongue one often sees in typhus. In some cases it remained clean until the third or fourth day of the attack.

The bowels were generally normal, but constipation was more common than diarrhoea.

#### EPISTAXIS

Epistaxis in the initial stages was only observed in one case. In some outbreaks this has been noted as a common symptom [Vide (4), (11), and contra (13)].

#### VOMITING

Vomiting was rare as opposed to Vandyke Carter (1) and others.

#### RASH

A rash was never noticed, and most observers agree in this. It is difficult to see a rash in a patient covered with louse-bites, as most of our cases were, and though Vandyke Carter, the most

careful observer of the disease, has described one, it is, at any rate, not at all an obvious sign.

#### THE LIVER

The liver was enlarged at the beginning of the attack in one case, the enlargement subsequently disappearing. This initial enlargement has also been noticed by v Hoesslin (9).

Jaundice occurred in one case without enlargement of the liver. Various observers have described a clinical type of the disease in which jaundice is a prominent symptom, and our jaundiced case fits in fairly well with this so-called 'bilious typhus type' [Vide McCowan (14)].

#### THE SPLEEN

The spleen was enlarged in 30 per cent of our cases. Many observers agree that this organ enlarges progressively during the periods of fever and diminishes again during the intervals [Vide (7), (9), (47), and contra (13)]. There is no doubt that in most outbreaks this organ is frequently enlarged, but in the epidemic in E. Africa in 1917–18 (13), and in Macedonia in 1917 (5), this does not appear to have been the case, and Delille (5) and others consider that in this latter outbreak an enlargement of the spleen indicated concurrent malaria. In the section until the relapsing fever was over we had very little malaria. It is noteworthy that in our one fatal case the spleen was *not* enlarged, and this case was of the bilious typhus type in which McCowan says it is always enlarged (14).

A case of spontaneous rupture of the spleen on the fifth day is on record (15).

#### JOINT AND MUSCLE PAINS

These were complained of in 21 per cent of our cases, but generally not until after the temperature had fallen as a result of treatment with neosalvarsan. In most outbreaks they are noted as common symptoms and some observers think they are important diagnostic signs (4), (9).

#### HEART AND CIRCULATORY SYMPTOMS

Beyond an increased pulse rate in proportion to the fever these symptoms were not observed. Okuniewski (20) has noted that there is no obvious change in blood pressure in this disease.

#### NUMBER OF DAYS

Number of case	1	2	3	9	11	13	45	46	64
1st period of fever	8	?	7	7	5	5	7	7	8
1st interval	5	8	8	?30		12	6	?	5
1st relapse	5					?	?		
2nd interval	8					?			
2nd relapse	4	914	914	914		16			
3rd interval	13								
3rd relapse	2								
4th interval	16								
4th relapse	1								

I have neglected this figure in the average as I think it probable that this patient, an extraordinary Russian, had a relapse, and did not appear at hospital. He only came to hospital on the last day of his first attack and then stayed but one day.

## THE RELAPSES

The attack of fever, with some or all the above symptoms in the few of our cases where it was not cut short by neosalvarsan, lasted from five to eight days (average from 61). The fever then fell by crisis as suddenly as it had risen, often to below normal. Great sweating generally accompanied the fall of temperature, and the symptoms in favourable cases were rapidly ameliorated. After an interval of from 5-12 days (average 68) without fever, another attack generally occurred very similar in its onset and symptoms to the first but generally of shorter duration. In the one case that was carefully observed through four relapses, the periods of fever became shorter, and the intervals longer with each relapse.

The lengths of the periods of fever and intervals of the eight of our cases which had at least one period of fever uninterrupted by neosalvarsan are shown in the table above.

## COMPARISON OF OUR OUTBREAK WITH OTHERS

In the duration of the attacks and intervals, as well as in the symptoms our cases agree well enough with the classical description of the disease by Vandyke Carter, and with most subsequent observers (4), (11), (12), (9).

In the outbreak in Serbia in 1916-17 (6), (7), however the attacks were shorter (3-3½ days, rarely 4 days) and this outbreak seems to have been altogether of a milder character—more than one relapse occurring but very rarely, and the mortality being practically nil.

The differences between our outbreak and the African one described by Manson and Thornton (13) are discussed below.

## THE DISEASE AS MODIFIED BY NEOSALVARSAN

After the administration of neosalvarsan the course of the disease is modified and as in almost all cases this or a similar drug would be given as soon as the disease was diagnosed it is this modified disease which is of the most interest.

On the administration of neosalvarsan the temperature does not fall until from 12 to 36 hours later (average 22 hours, one case took 48 hours and one 72 hours), and then by crisis. In the cases which subsequently relapsed the time taken for the temperature to fall was longer than in those which were cured by one dose (25.3 hours against 20 hours). In these cases also, the time taken for the temperature to fall after the second dose of neosalvarsan was longer than normal (average 27.4 hours), and this seems to indicate that these cases were less reactive to the drug. On the fall of the temperature the other symptoms were in favourable cases, all rapidly ameliorated, and the patient was fit to go out of hospital in 3 to 5 days.

In three cases the temperature rose again 2-4 days after the neosalvarsan, but spirilla were not found in the blood. In two of these cases it remained up for two days and the patients then made a good recovery, but in one case it

remained up for six days, until the patient died in a typhoid-like stage. Vandyke Carter has noticed a similar rise of temperature, without spirilla in the blood in some cases during the first interval.

## SYMPTOMS OCCURRING AFTER NEOSALVARSAN

I was unable to determine certainly how far the symptoms occurring after neosalvarsan were due to the disease or to the drug. They were however, such as have been noted as common in cases of this disease which did not have this drug. The chief were severe headache from 2-4 days after the injection (31 per cent) and pains in the joints and muscles (21 per cent). In one case there was actual swelling of a joint (the left wrist).

Epistaxis occurred in 6 per cent of the cases and deafness or pain in the ear in 8 per cent [Noted as a common symptom by Toyota (12) and v. Hoesslin (9)]. Vomiting, irregular pulse, and giddiness occurred in one case each.

## RELAPSES AFTER NEOSALVARSAN

In the cases which relapsed after a dose of neosalvarsan, the relapse was much delayed, to from 14 to 30 days (average 19.0 days). During the interval after their recovery from the first attack (average 4.6 days) they were apparently quite fit until the relapse, which was similar in its onset to the original attack. In the one case which had a second relapse after two doses of neosalvarsan, each interval was 24 days.

In view of the long interval, it is quite possible that these relapses were really re-infections. Various observers have stated that little or no immunity is conferred by an attack.

The prolongation of the intervals after arsenobenzene compounds has also been noticed by Manson and Thornton (13) and Portocalis (41).

## THE ONE FATAL CASE

In the 66 cases only one death occurred  $\frac{1}{66} = 1.5\%$ , and this case presented some unusual features, which it may be of interest to describe shortly.

The patient was an Indian Mahomedan prisoner of war who was sent into the headquarters hospital from a small working party, some 30 miles away, across a waterless desert. A film of his blood had been examined, and found to contain spirilla, four days before the patient himself arrived. On admission his temperature was  $38.2^{\circ}\text{C}$  and he gave a history of nine days' fever. He was very weak, his tongue was dry and furred, and he was deeply jaundiced. His spleen was not enlarged. At the time of his admission his blood did not contain spirilla, but he was given a dose of 0.3 gr neosalvarsan intravenously. His temperature fell in 12 hours but very collapsed he was. On the third day the fever returned, and he remained in a typhoid-like state for six days until he died. Five days before his death he developed a painful inflammatory swelling of his left



parotid—a symptom noted by Vandyke Carter in 2 to 3 per cent of his cases

This case is similar to the 'bilious relapsing fever' described by McCowan (14) and others

#### COMPLICATIONS AND SEQUELÆ

Our cases showed very few complications or sequelæ, possibly owing to the early employment of neosalvarsan. One case of facial paralysis occurred, and one case each of bronchitis and conjunctivitis, but it is impossible to determine whether these were coincident accidents or not. Facial paralysis has been noted as 'common' in this disease by De Ruddere (42).

Other observers have recorded numerous complications particularly of the nervous system, both psychosis (19) and paralysis (18) and meningitis (3). Bronchitis was a common complication in E. Africa in 1916 (13).

#### ASSOCIATION WITH OTHER DISEASES

Both typhus and malaria are often associated with this disease. Typhus one would expect since it also is louse-carried and occurs under similar conditions. At Tel Hadi we had no typhus, but in other parts of Turkey I am fairly certain that the two diseases occurred simultaneously, and cases of relapsing fever were diagnosed 'atypical typhus,' for if such an outbreak occurs it is not easy to distinguish the two without a microscope. An outbreak of either means that conditions are ripe for the spread of the other and its concurrence should be watched for.

Three of our cases had concurrent malaria, about the proportion to be expected from the incidence of the latter disease. The clinical picture is confused by superadded malaria, and some French writers (5), (6), (7) have divided their cases into three classes, according as malaria is absent, coincides with, or follows the relapsing fever. Duchamp (28) even suggests there is a sort of symbiosis of the two parasites. With a microscope the differentiation is easy.

#### DIAGNOSIS

With a microscope diagnosis is easy and certain during the attacks, with the proviso that the spirilla are sometimes not to be found continuously throughout the periods of fever.

If the case is first seen after the initial attack is over, diagnosis is not generally possible until a relapse occurs. Van Hoof (3) in E. Africa has found that during this disease there is a leucocytosis of myelocytes and large mononuclears and a corresponding relative diminution of polymorphonuclears and small mononuclears, and suggests this can be used as an aid to diagnosis during the intervals when the spirillum cannot be found.

Without a microscope, however, the disease can rarely be diagnosed with any certainty until the first relapse, and an outbreak of this disease demonstrates very well how soon the cost of providing a bacteriological outfit is repaid in the lessened amount of sickness. This point is not

always conceded even in England, by the layman. In Turkey, and I think often in Germany, a microscope is looked on as an unnecessary luxury except for great bacteriological experts.

#### TREATMENT

There is only one form of treatment worth considering—the administration of an arseno-benzene which has a specific action on the spirillum. Obviously while the fever is high, the patient must be kept in bed, on a light diet, the bowels must be attended to, the headache may be treated with pyramidon and so forth, but the crux of the matter is—which and how much of the arseno-benzene compounds should be given and by which route?

The best route is undoubtedly direct into a vein. In three of our cases neosalvarsan was injected intramuscularly into the buttock, but it was found that this gave rise to very severe pain at the time of injection and inflammation afterwards. None of the cases actually developed an abscess which had to be opened, but one case appeared very nearly to do so. In the cases treated by intravenous injection, with the technique adopted, no cases of the slightest local inflammation occurred and the pain was limited to the prick of the needle.

As other observers (43) have recorded local trouble after intravenous injections of concentrated neosalvarsan, and I have never come across a technique quite similar to the one adopted, I venture to give it at length.

#### THE TECHNIQUE ADOPTED FOR INTRAVENOUS INJECTIONS OF NEOSALVARSAN

The patient is given a strong purge, time is allowed for it to act, and if necessary the purge is followed by an enema. He is given no food for four hours before injection.

Two hypodermic syringes, one at least of 10 c.c., and two interchangeable needles are boiled in a clean saucepan in distilled water. The tube of neosalvarsan is scratched with a file and rubbed over with alcohol.

Meanwhile the patient is laid flat on a couch, his arm bared to the shoulder, the hollow of the elbow painted all over with iodine, and a piece of bandage tied round the upper arm tight enough to compress the veins. If the veins are indistinct one or two suitable ones are marked with indelible pencil before painting with iodine.

The operator washes and disinfects his hands as for an operation, fits together the two syringes, and draws up about 3 c.c. of the boiled, and still hot, distilled water into the 10 c.c. one. He breaks the neck of the neosalvarsan tube, and squirts the 3 c.c. of water in. The neosalvarsan dissolves at once, and is drawn up into the syringe, and distilled water drawn up till the total bulk is 6 c.c. Any air is expelled and this syringe placed ready across the saucepan.

The operator now takes the other syringe and pushes it through the skin of the patient into, and a little way along inside, a vein, drawing

up some blood to make sure he is properly in. If he should, by accident go through the vein and out the other side, as shown by a rapidly increasing local swelling, the syringe should be at once withdrawn and the operation restarted on another vein.

The needle being properly in, the bandage round the upper arm is loosened and the needle is left in its place while the syringe with the solution of neosalvarsan is substituted for the other syringe. Should a drop be spilt in the process it is immediately mopped up.

The neosalvarsan is now injected slowly and steadily at about the rate of 1 cc per minute, and when the injection is complete before removing the needle, a few cc of blood are drawn up and returned two or three times to wash out any residual neosalvarsan in the syringe or needle. The syringe is then depressed so that the side of the vein comes against the hole at the end of the needle, and the piston again withdrawn so that a partial vacuum is created inside and the syringe and needle then quickly withdrawn. By this means, a trace of neosalvarsan, if still left inside the needle, is sucked inside the syringe during withdrawal, and not left in the tissues of the arm. It is not difficult to do.

A drop of collodion is put on the wound and a pad of wool. The patient is kept lying flat on the couch for at least one hour, and is then taken away on a stretcher, put to bed, and kept on milk diet until the temperature falls.

By this technique none of the neosalvarsan can come in contact with the subcutaneous tissues of the arm. It should be remembered that any blood left in the syringes or on the patient's arm is infectious, and steps must be taken to destroy the organisms in it.

#### THE DOSAGE

The conclusion arrived at from observations in this outbreak was, that 0.45 gram neosalvarsan intravenously was the best dose.

In 30 cases 0.3 gram was given, and in eight of these cases subsequent relapses necessitated a further dose of 0.3 gram, and in one case two further doses. Amongst those 20 cases that had 0.45 gram in the first place, no relapses occurred. Some observers (3), (13), (42) have noted that neosalvarsan is more effective if given in the first attack, and we were fortunate in that respect in seeing our cases early—only three cases being treated with intravenous neosalvarsan for the first time during a relapse. Of these cases one had 0.45 gram and two 0.3, and none of them relapsed.

Patients suffering from this disease are said not to bear large doses of neosalvarsan well, and it is desirable that only just an adequate dose should be given.

The average time in hospital, after receiving an injection, of those that received 0.45 was 3.2 days, against 4.3 days in the first case of those

who had 0.3 gram, and a subsequent 6.25 days in the eight that relapsed.

The average time in hospital of the three cases who did not receive neosalvarsan, but who were not lost sight of, was 40.6 days, and of the 58 cases who received it either intravenously or intramuscularly was 6.8 days.

#### A table showing the results of treatment

Number of cases	Attack	Dose of 914	Hours for temp to fall	Days in hospital after injection	
20 1st		0.45	19.8	3.15	} No relapses
1 2nd		0.45	24	4	
20 1st		0.3	19.2	4.2	
6 1st		0.3	30	5.5	} Relapsed & given another 0.3 gram
1 1st		0.3	24	7	
1 1st		0.2	12	3	No relapse (a boy)
2 1st		0.3 twice			No relapse
1 During interval		0.3	Died 9 days later		
1 1st		0.3 into buttock	12	3	No relapse
1 1st		0.45 into buttock	12	31	One short relapse
2 1st		do	12	9	Relapsed and was given 0.3 intravenously. Good recovery

#### ON THE USE OF OTHER DRUGS THAN NEOSALVARSAN

In the treatment of our outbreak, neosalvarsan was the only one of the various arsenobenzene compounds tried because it was the only one we had but from the number of papers (11) (40), (42) (43), (44), (46) I have since found, written to show other drugs are just as good as neosalvarsan, I gather that the latter drug is the best.

It is often stated (21), (50) that neosalvarsan does not work so well in this disease in Africa as elsewhere [Hegler (10) says the same thing of Palestine] and the Belgian doctors in E. Africa recommended 'Satoxyl'\* in preference to it. Manson and Thornton have however, concluded after a very careful trial of many drugs, including satoxyl, that novarsenobillon is the best. I have not been able to discover what, if any, is the difference between this and neosalvarsan.

Of the drugs other than arsenobenzene compounds, Arrhenal (di-sodium-methyl-arsenate) is the only one I can find reported to have much effect, and this is recommended as a substitute for neosalvarsan, when the latter is difficult to obtain, by Dumitresco-Mante (46).

\* Satoxyl is —

Atoxyl	10 grammes	} Dose 3—4 c.c. intramuscularly twice weekly
Mercury Perchl	0.3 gram	
Pot iodide	2.5 gram	
Water	to 100 c.c.	



Serum treatment has not so far given very good results (41)

### PROPHYLAXIS

The obvious prophylactic measure is to kill the vectors—in this outbreak, lice,—and the most important fact in devising schemes to this end is that lice and their eggs are easily killed by a comparatively low degree of dry heat [55°C for 30 minutes or 60°C for 15 minutes (50)]

In ordinary civil life, if one keeps oneself reasonably clean, one does not get lice, and the ordinary sanitary measures in such a country as England are quite a sufficient prophylaxis against the spread of this disease, but with troops under war conditions it is different, and during the war many elaborate and excellent schemes for de-lousing (according to Nuttall the word should be 'lousing') the troops were devised. These vary with the means at one's disposal, and to go into the matter is beyond the scope of this paper

In the Tel Hadî hospital, our method, which proved quite effectual was, shortly —

Each patient on admission was deprived of all his clothes, shaved of all hair, and given a hot bath with soap. He then, when clean, was supplied with clean hospital clothing and clean bedding, and his own clothes, after being baked in a dry heat of more than 60°C for 15 minutes, were stored till he left the hospital

All the hospital mattresses, bedding, linen, etc., were regularly baked in rotation. The clothing of the hospital staff was baked about once a fortnight, or oftener if any of them found lice in their things

The floors of the hospital were washed or sprinkled with a suspension of chloride of lime in water

Unfortunately, chiefly owing to the scarcity of fuel, we could not extend such a scheme to all the inhabitants of the section

The heat of a tropical midday sun is quite sufficient to kill lice, and Wanhill (51) has dealt successfully with an outbreak of relapsing fever by moving the troops attacked out into camp on the banks of a river where they could wash themselves and their clothing and use the sun to destroy the lice and eggs. The lice in the houses occupied were left to starve, which they soon do if deprived of animals to feed on

As remarked above, any blood, and possibly other fluids, coming from a relapsing fever patient, during the fever at any rate, is very infectious and must be destroyed. Scratching should be avoided, both by the prospective patient to allay irritation, and by the barber when shaving. As bedbugs can carry the disease these should also be dealt with

In Africa, against *Ornithodoros moubata*, prophylaxis consists in personal precautions at night when the ticks feed, and disinfection of the tick-infected houses [Vide (50), page 218, etc.]

### APPENDIX

As an appendix I have added three notes —

- (1) On the invasion of tissues other than the blood by the spirillum,
- (2) On the mortality in other outbreaks,
- (3) On the varieties of relapsing fever, and a list of authorities quoted in the paper, with short notes to indicate the nature of the book or paper, arranged under the following headings —

- (1) General accounts of outbreaks
- (2) On special types of the disease, etc
- (3) On the spirillum and the vector
- (4) On the treatment
- (5) Accounts of the disease in text-books, etc

#### ON THE INVASION OF OTHER TISSUES THAN THE BLOOD BY THE SPIRILLUM

The invasion of tissues other than the blood by the spirilla has occasionally been reported. Brault and Montpelier (25) have found it in the sweat and tears, and perhaps in the cerebro-spinal fluid. Two other observers (4), (13), however, agree, that it is never present in this latter fluid, even in cases showing cerebral or meningeal symptoms

Its presence in the urine too is very doubtful. Dudgeon (27) found a spirillum in 30 per cent of the urines of a series of relapsing fever cases. But Stoddard found that 46 per cent of the urines of healthy subjects treated similarly showed spirilla. Manson and Thornton (13) never found it in the urine, nor according to them does it seem to be present in the sputum unless contaminated by blood

#### ON THE MORTALITY IN OTHER OUTBREAKS

The mortality in this disease, which used to be called 'famine fever,' is no doubt influenced by the often added condition of semi-starvation of the patients. It shows, however, I think, a tendency to decline, due perhaps to the introduction of treatment by arseno-benzene compounds

Vandyke Carter's mortality was 18.02 per cent and in many of the outbreaks before his time was even higher, up to 50 per cent. In recent outbreaks it has varied from nothing or very little in Servia in 1916 (6), and Macedonia in 1916-17 (4), (5), and E. Africa in 1917-18 (13) to 8 per cent in Manchuria in 1918 (12) and 17.18 per cent in Albania in 1916 (8)

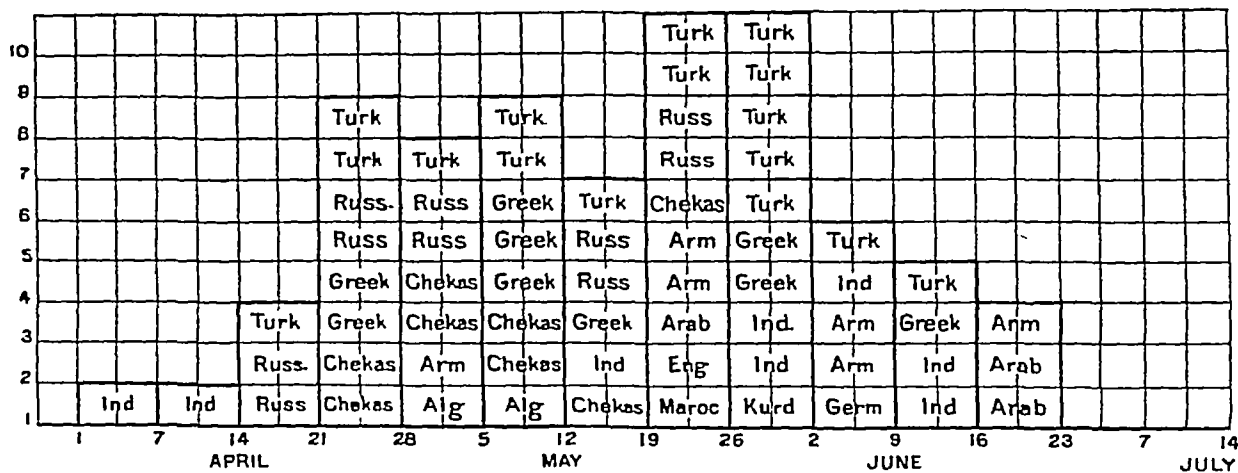
#### ON THE VARIETIES OF RELAPSING FEVER

*Clinical varieties*—It is usually considered that there are at any rate two varieties of relapsing fever, the European and the African—the disease as seen in India, America and as recently described in Manchuria (12) not being essentially different from the European variety

A very excellent account of the disease as seen in E. Africa, from observations on no less than 1,500 cases, has recently been published by

ON AN OUTBREAK OF RELAPSING FEVER IN TURKEY IN 1918

BY CAPTAIN CLIVE NEWCOMB, M D (Oxon ), A I C , I M S ,  
Officiating Chemical Examiner to the Government of the Punjab





Manson and Thornton (13) The resemblances between this disease and the European or Indian variety are much more striking than the differences and there is hardly a feature in this description that cannot be matched in some outbreak or other in other continents

*The differences*—In the African disease, the temperature remains up in the first attack for a variable period, 'usually for three days' [(13), page 107], and in subsequent attacks for but two days or less (Precise details are wanting) This is the period given in the outbreak amongst the Serbs in 1916-17 (6) (7), but the rule in the European variety is 5-7 days Vandyke Carter reckons an average of seven days for the first attack, but says this figure is probably too big, as the patients in giving their histories were prone to exaggerate the length of their illness before appearing at hospital

The number of relapses in Africa amongst the W. African natives living in E. Africa is ordinarily five and up to eleven Amongst the E. African natives the relapses are as a rule fewer (in 30 per cent none at all), but up to nine have been observed In other continents more than four hardly ever occur The latter ones of these numerous relapses in the African variety are rises of temperature to from 99 to 100 degrees F for a few hours, and consequently would in all probability be overlooked unless the patients were under very careful observation That they were true relapses is shown both by their regular periodicity, and by the appearance of spirilla in the blood

In Africa the common vector is the *Ornithodoros moubata* and in other continents the louse Although lice were prevalent in E. Africa, Manson and Thornton bring some evidence that they never carried the disease there, but the evidence is not conclusive As Toyota remarks the *Ornithodoros* can carry the disease if introduced into other countries, and other animals, *e.g.*, the bed-bug can, and probably do, sometimes carry it

Manson and Thornton found that spirilla were most plentiful in the blood at the beginning of the attacks and often disappeared towards the end This is directly opposed to observations in other continents, where the maximum number of spirilla in the blood is not reached before the third day of the fever

The observation of various previous workers (21), (50), that the African variety does not react so well to arseno-benzenes is not confirmed by Manson and Thornton

*Differences in the parasite*—Four varieties of the parasite are often described, the *Sp Obermeieri* in Europe, the *Sp Carteri* in India, the *Sp Duttoni* in Africa, and the *Sp Novyi* in America, chiefly owing to a paper by Novy and Knapp (22) in which this division was advocated Both morphological and serum reaction differences have been described in the parasites and differences in the clinical diseases they produce.

The clinical differences have just been dealt with

Nuttall (23) and Bayon (24) in 1912, Macfie and Yorke (26) in 1917, and Toyota (12) in 1919 have all concluded that there are no recognisable morphological differences between organisms from different parts of the world

The serum reaction differences are by no means clear and precise and various observers do not agree at all amongst themselves as to them Toyota (12), after a long and careful research, thinks that the so-called species can be transmitted by prolonged passage through animals I think this observer (who although he writes in that language is not a German) comes to a safe conclusion in saying "Es ist unserem jetzigen Wissen nach unmöglich die Rekurrenssporiochaeten in verschiedene Arten einzuteilen"

#### GENERAL ACCOUNTS OF OUTBREAKS

- (1) Vandyke Carter, H  
Spirillum fever London, 1882  
A large book of 450 pages, devoted to a most careful and detailed description of the disease as seen in Bombay in 1877-80  
Sir Leonard Rogers refers to it as the classical account of the disease
- (2) Walker, E. A  
Spirillum Fever in India I. M. S. Gazette, 1905, p. 320  
Only a letter with some details, from memory, of an outbreak on the North West Frontier
- (3) Van Hoof, L  
Note préliminaire sur la fièvre récurrente parmi les troupes dans l'Est Afrique Allemande Bull. Soc. Path. Exot., Paris, 1917, x, pp. 786-791  
A clinical description of an outbreak in East Africa
- (4) Portocalis, A  
Sur l'épidémie de la fièvre récurrente observée récemment en Macédoine Bull. et Mém. Soc. Méd., d'Hôp. de Paris, 1917, 3, s. xli, p. 780  
A clinical description of the outbreak amongst the Greeks in Macedonia in 1916-17 (800 cases)
- (5) Armand Delille, P. Garsin and Lemaire, H  
Les principaux caractères de la fièvre récurrente à l'armée d'Orient Bull. et Mém. Soc. Méd., d'Hôp. de Paris, 1917, 3, s. xli, pp. 778-780  
A clinical description of a small outbreak amongst the French troops in Salonika in 1916-17 (50 cases)
- (6) Duchamp, C. J.  
Contribution à la pathologie des Balkans. La fièvre récurrente des Serbes Bull. Acad. de Méd. Paris, 1917, 3, s. lxxvii, p. 372  
A clinical description of the disease amongst the Serbs in 1916
- (7) Duchamp  
La fièvre récurrente chez les Serbes Prog. Méd., Paris, 1917, 3, s. xxxii, 10-12  
A clinical description of an outbreak in Serbia 1916-17 (71 cases)
- (8) Weiner, E.  
Ueber eine Rekurrensepäpidemie Méd. Klin., Berlin, 1917, xiii, p. 1043  
A description of an outbreak in Albania in 1916-17. The statements are often very vague and statistical details are wanting
- (9) Von Hoesslin, H.  
Zur Klinik des Rückfallfiebers Münch. Med. Wochsch., 1917, lvi, pp. 1065 & 1106  
A long paper with a very full clinical description of the disease. The therapy is not well treated of

- (10) Hegler  
Erfahrungen über Febris recurrens Wein Klin Wochsch, in Palistina 1917, xxx, p 547  
A short report of a medical meeting and discussion. One of the speakers a Dr Apostolides gives shortly clinical details of more than 950 cases he had had in Palestine
- (11) Bertois  
La fièvre récurrente Jour de Med et Clin prat, Paris, 1918, lxxviii, pp 932-946  
A general description of the European variety of the disease, clinical and pathological. The world distribution is dealt with at length.
- (12) Toyota, H  
Studien über die Recurrens spirilla in Mandchurien Kitasato, Arch Ex per Med, Tokio, 1919, pp 43-84  
A long and careful paper describing—  
(1) Various experiments on the inoculation of spirilla into animals, and serum reactions  
(2) The clinical features of an outbreak in Manchuria (70 cases)
- (13) Manson, J K & Thornton, L H D R A M C Journal, East African Relapsing Fever 1919, August, pp 97-116, Sept, pp 193-216  
A long and very good account of the disease in East Africa (1,500 cases)
- ON SPECIAL TYPES OF THE DISEASE, etc
- (14) McCowan W T  
Bilious typhus and relapsing fever I M S Gazette, 1906, pp 387-396  
A detailed clinical account of the bilious typhus type of the disease
- (15) Jansig & Jurincoe  
Ueber einen Fall von Milzruptur bei Febris recurrens Wiener Klin Wochsch, 1917, xxx, p 1651
- (16) Porat, A  
Délire et réactions psychomotrices dans la fièvre récurrente de l'Inde Bull Soc Path Exot, Paris, 1917, v, pp 532-536  
On early delirium as a prominent symptom in N Africa
- (17) Parrot, L  
Du délire et des réactions psychomotrices dans la fièvre récurrente algérienne Bull Soc Path Exot Paris 1917, x, pp 692-694  
On the absence of delirium in N Africa
- (18) Yacoub, K  
Spirochætal dysentery and post spirochætal paralyses during an epidemic of relapsing fever Practitioner, Lond 1917, xciv, pp 487-491  
A good paper, clear, short, and to the point
- (19) André Thomas, Loygue & Levy Vallensi, J  
Accidents nouveaux au cours du typhus récurrent considérations sur l'ataxie aiguë Rev neurol, Paris 1918, xxx, pp 216-220  
Only one case
- (20) Sterling Okuniewski, S  
Blutdruck im Verlaufe von Rückfallfieber Deut Med Wochsch, 1918, p 205  
Concludes—'Es wird also im Laufe von Rückfallfieber meist kein deutlicher Einfluss der Krankheit auf den Blutdruck beobachtet'
- (21) Redford, J H & Duke, H L  
A case of Spirillum fever in (German) East Africa R A M C Journal, 1919, Jan, pp 78-81
- ON THE SPIRILLUM AND VECTOR
- (22) Novy, F G & Knapp, R S  
Studies on *Sp Obermeieri* and related organisms Jour Infect Dis cases 1906, Vol III, pp 291-303  
A paper of over 100 pages and mainly responsible for the division of relapsing fever spirilla into the four species
- (23) Nuttall, G H F  
Herter Lectures, 1912 I Spirochaetosis Parisitology, 1912, Vol v, pp 262-274  
A very good summary of the evidence for the louse as the vector. The author concludes that there is only one species of *Sp recurrens*. Some interesting notes are given on the life history of the louse from experiments
- (24) Bayou, H  
Experimental transmission of the spirilla of European relapsing fever to rats and mice Ibid, p 135  
Concludes that there is no morphological difference between *Sp recurrens*, *Sp Duttoni* and *Sp Novyi*
- (25) Brault, J & Montpellier, J  
Note sur la présence du spirille de la fièvre récurrente en Nord Afrique dans quelques liquides et excréta de l'économie Bull Soc Path Exot, 1914, Vol VII, p 472  
The 'liquides et excréta' are the cerebro spinal fluid, the sweat and the tears
- (26) Macfie, J W S & Yorke, W  
The relapsing fever spirochaetes Concludes that there is no morphological difference between the various species of *Sp recurrens* Ann Trop Med & Parasitol, Liver pool, 1917, v, 81-85
- (27) Dudgeon, L S  
Examination of the urines in cases of relapsing fever occurring in Macedonia Lancet, London, 1917, II, pp 823-825  
The author found spirilla in 27 out of 82 cases, but it is probable that these were not *Sp recurrens*
- (28) Duchamp, C J  
Fièvre récurrente Suggests a symbiosis of the *Sp recurrens* and the malaria parasite Presse Med, Paris, 1917, xxx, 210
- (29) Koch, J  
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REFERENCE TO ARSENO BENZENE COMPOUNDS  
IN THE TREATMENT OF RELAPSING FEVER

SALVARSA	(13),	(36),	(37),	(38)
NEOSALVARSA	(13),	(38),	(39),	(40), (45)
ARSALYTS	(bis methylamino tetramino arseno benzol)	(43),	(44)	
OLARSOI	(? composition)		(39)	
LUDYL	(Phenyl-disulph amino tetraoxy diamene diarseno benzene)		(40)	
GALYL	(Tetra oxy diphosphamino diarseno benzene)	(11),	(13),	(40), (41)
ATOXYL	(Sodium amino arsenate)			(13)
SATOXYL	(v, p 21)	(13)	(42)	

## NOTES ON INFLUENZA

By J H McDONALD,

LIEUT.-COLONEL, I M S,

DURING the winter of 1918-19, the bacteriological examination of sputa in cases showing influenzal symptoms revealed the almost invariable presence in large numbers of a Gram-negative cocco-bacillus,—an organism not found prior to this in pneumonic conditions in Abbottabad The cultivation of this proved it to be the coli type of the Friedländer group In the face of general opinion it was difficult to associate this with the epidemic then prevailing, but the fact that in five cases this organism was obtained in pure culture from pleuritic effusions naturally raised a doubt, which could not be removed by further observations owing to the cessation of the disease During this last winter, noting again the predominance of this cocco-bacillus, I carried out observations in connexion with over 200 cases which have forced me to the conclusion that this organism is playing a great, if not the chief, part in the present epidemic for the following reasons —

1 Its invariable predominance in the sputa of nearly all (95 per cent) laryngeal and pneumonic cases and its presence almost in pure culture in over 40 per cent of the cases

2 The total absence of any organism like the influenza bacillus or pneumococcus even on repeated examinations of sputum from the same case and entire failure to obtain evidence of either even on selective media

3 Its highly pathogenic properties— $\frac{1}{2}$  c.c. of a broth emulsion injected under the skin being a lethal dose for a quail or pigeon with death in 8 to 12 hours, and 5 c.c. for a rabbit or guinea-pig proving fatal in 18 to 24 hours. The organs show all the signs of acute septicæmic poisoning and the cocco-bacillus is found in, and can be cultivated from, the blood

*Morphology*—Its pleomorphism is evident in both sputum and cultures

In cultures its variations are dependent on the medium and on the cultures being primary or secondary. The following table shows the development according to these factors—

A	B	C
Medium	Primary Culture	Secondary Culture
(1) Blood Agar	Short stout cocco bacilli with coccid forms	Smaller cocci with more slender and frequently longer bacilli
(2) Ordinary Agar	Mainly coccal and diplococcal forms	All coccal forms.
(3) Broth	Mixed coccal, diplo coccal and bacillary forms	Similar
(4) Boiled white of egg	Mixed forms as in (3), but smaller and with but few bacillary forms	Mainly coccal and diplococcal
(5) Gelatine Slope	Seldom obtained and then showing only coccal forms	Nil
(6) Gelatine Stab	Growth scanty and limited to surface—chiefly coccal forms	Nil

Transference from (3) or (4) to (1) shows the same as C (1) usually and rarely B (1)

*Cultural characteristics*—The growths on various media correspond with those of Friedlander's pneumo-bacillus differing, however, in the following respects—

(1) Its growth on various media is by no means exuberant except in broth and sometimes on blood-agar and boiled egg-white. On ordinary agar and gelatine only the short stout cocco-bacillary form develops as a rule, and then scantily, showing mainly coccal forms. Even when extensively prevalent in sputum cultivations prove a failure

(2) Encapsulated forms are rarely seen in sputum or cultures unless the latter be passed through a bird or animal, when they become evident

(3) The lanceolate form is rarely seen, the bacillus being either an elongated coccal form or sausage-shaped. Except the diplococcal form pairing is seldom seen, the bacilli grouping themselves in palisade fashion

*Relationship of germ to disease*—A comparison between the conditions found clinically and bacteriological findings tends to strengthen the opinion that this cocco-bacillus plays a great, if not the chief, part in the causation of the

disease. The following table represents the comparative states—

Bacteriological	Clinical
1 Short stout cocco bacillary forms predominant	Symptoms very severe Septicæmic conditions marked, involvement of lung not proportionate. Sputum thick and gangrenous (green and foul smelling)
2 Coccal and diplococcal forms predominant	Symptoms vary according to severity of infection. Septicæmia as marked as (1) if infection severe sputum yellowish or yellowish green semi liquid with tinges of rust or bright coloured blood
3 Coccal forms only	Symptoms mild Septicæmia not marked. Sputum yellowish and semi liquid

*Mode of infection*—Thus, as far one can see, is entirely through the respiratory system

*Nature of infection*—This appears to be a septicæmia more than a septicæmia for the following reasons—

(1) Repeated examinations of blood smears taken *ante mortem* from the peripheral circulation and *post mortem* from the heart and lungs show the presence of no organism, while at the same time the sputum may be swarming with them

(2) Cultures made from the blood, *ante*- and *post-mortem*, prove negative

(3) Cases clinically showing no pulmonary abnormality till the patient is moribund and then only a congestive condition, prove fatal from a pharyngeal or laryngeal affection the sputum alone exhibiting the presence of the cocco-bacillus in one of its forms

*Chronic infections*—From my observations it would appear that the existence of a chronic influenzal infection has not been fully realized. Cases not infrequently met with are considered, owing to the hectic nature of the temperature and signs of pulmonary disintegration or empyema, to be due to tubercular infection. Repeated examinations of the sputum reveal no tubercle bacilli but the presence in considerable quantity of the same micro-organism with staphylococci or streptococci. Sajous in his *Encyclopedia* points out the occurrence of such cases in pure influenzal affections and Besson in his *Manual of Bacteriology* shows the effects of mixed infections. We ought, then, to remember not only the possibility of such chronic conditions, but the dangers arising to the public by neglect of measures to prevent the spread of the disease. For most people will keep clear of a patient acutely infected, but in ignorance will not avoid a chronic case

*Treatment*—Much has been written and said about gargles of various kinds. While not depreciating the value of these one is brought face to face with incontrovertible facts, showing how such useful information can prove a source of raillery for the misbeliever. The facts are these—

(1) What percentage of the Indian population will actually take the trouble to gargle

properly with any medicated solution even once a day? The very admixture of any such substance even in drinking water results in its total avoidance.

## (2) Spirituous forms of medication

The penetrating power of spirits when inhaled makes these far more efficacious, and as inhalations they have, in my hands, proved more successful arresting the development of general symptoms it used at the initial stage. The combination of creosote or iodine with tinct benzoin oil and rectified spirit acts rapidly and most effectively. The ease with which inhalation can be done by sprinkling the solution on a piece of lint makes it more acceptable to people generally.

# A Mirror of Hospital Practice

## IMPROVISED TRIPLE-BLADED BAMBOO GASTRO-ENTEROSTOMY CLAMPS

By KHURSHID HUSAIN, M.B., B.Ch. (Edin)

*District Civil Surgeon, Raichur*

I AM sending an account with a drawing and a sample of the 'Improved Triple-bladed Bamboo Forceps,' used successfully in Raichur Dispensary for posterior gastro-enterostomy operation.

to pyloric stricture, was waiting for operation. He was very uncomfortable, and was so inclined to commit suicide if not operated on, that on not receiving any instrument from Bombay I prepared a set of forceps from bamboo and performed the operation on 15th March, 1920 (11th Ardebakist 1329), and found the improvised triple-bladed bamboo forceps more handy and suitable. The diagram of it is given below in Fig 2.

Figure No 1 is Moynihan's triple-bladed stomach clamp and is metallic, blades of it are smooth and have no curve in them.

Figure No 2 is the improvised triple-bladed bamboo forceps. The following are its advantages —

1 It is easily available and prepared, as it is made up of only a piece of bamboo and needs only a knife to prepare it.

2 It is so cheap as not to cost even two dabs, whereas metallic triple-bladed forceps cost more than Rs 40.

3 It is sterilised well simply by boiling. Bamboo blades, I found, on boiling lose their rigidity and become more elastic and conveniently flexible which is especially needed. For the operation, as a precaution I had prepared four sets of forceps, one I sterilised by boiling others I sterilised by the application of tincture of iodine, spirit, carbolic acid, etc., but I found the forceps sterilised by boiling served the purpose well.

4 The tear in the bamboo gives a good and handy grip for holding the portions of

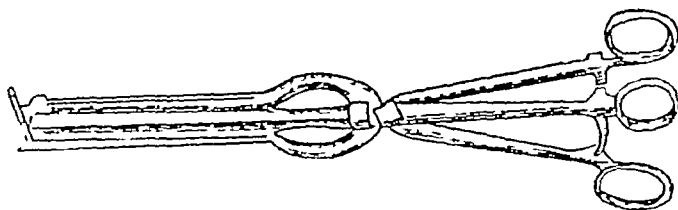


FIG 1 — Moynihan's Triple bladed Stomach Clamp

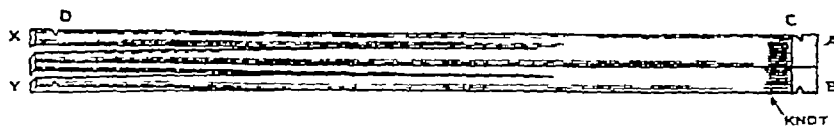


FIG 2.—Improved Triple bladed Bamboo Clamp for Gastro-enterostomy.

Gastro-enterostomy operation is performed usually by triple-bladed forceps, of which there are many varieties in use, such as — (1) Moynihan's triple-bladed stomach clamp, (2) Roosevelt's triple-bladed stomach clamp, (3) Mayo-Robson's triple-bladed stomach clamp, and others.

Having none of these in the dispensary, I ordered for one from Bombay, as a case of huge dilated stomach of 18 years' standing due

bowels. The grip is made firmer or looser by placing the portion of bowel closer or further from the joint and also by simply tying a piece of thread at the ends of the blades.

5 The grip of bamboo blade is not so tight as to clamp the stomach tightly crushing its blood-vessels, etc., so much as to reduce its vitality.

6 The elasticity, flexibility, and softness of bamboo blades do not require rubber tubing



for the blades, nor serration of the inner surfaces of the blades, nor curvature of the blades

### NOTE

By LIEUT-COL. F P CONNOR, DSO, FRCS

A SPECIMEN of a bamboo clamp, which can be quite easily improvised in a few minutes, has been sent to us by Dr Khurshed Husain, M.B., Ch.B. (Edin), District Civil Surgeon, Raichur. This instrument was used, we are informed, for operating on a case of huge dilated stomach of 18 years' standing, due to pyloric stricture.

The idea is an ingenious one, and owing to the natural elasticity of bamboo, quite an efficient clamp can be made. The nature of the contrivance can be readily understood by studying the diagram (Fig 2). Two separate pieces of bamboo, A and B, are split at one end X and Y, and when tied together at the knotted ends, C, in the groove provided, a three-bladed clamp is improvised. When the selected portion of stomach and bowel are introduced by separating the split ends at X and Y, the blades are clamped together by tying them at the notched ends, D, and anastomosis can be readily effected.

We have not had an opportunity of trying this instrument on an actual case, but feel sure that it would serve its purpose admirably.

### EPITHELIOMA OF UPPER LIP IN A BOY 14 YEARS OF AGE

By L. P. STEPHEN, M.B., F.R.C.S.,  
LIEUT-COLONEL, I.M.S.  
Civil Surgeon, Karachi

THE history was that two years ago a tumour appeared on the right upper lip. It was removed by operation and a recurrence took place three months after.

The physical signs on admission to Karachi Civil Hospital, in February 1920, were as follows —

A tumour was present on the right upper lip, which extended beyond the middle line to the left and involved also the right angle of the mouth and a part of the lower lip. The tumour was hard with raised edges, ulcerating and fungating, covered with dirty wash leather slough and discharging sero-pus.

On the right cheek adjacent to the principal tumour were several secondary nodules, which were raised and warty in appearance, but were not ulcerating. The submaxillary and submental glands on both sides were enlarged and hard, but were not adherent to the jaw.

At the same time there was a tubercular spondylitis of the left fourth toe. The toe was amputated and the diagnosis confirmed.

A piece of the tumour of the lip was excised and sent to Parel laboratory for examination and the report was "A rare case of epithelioma of the lip."

The case appears worthy of record, owing to the rarity of epithelioma of the lip in so young a patient. Photographs of the case are attached

### NOTES ON A CASE OF CYSTIC KIDNEY

By A. VISWALINGAM

Acting Medical Officer, Kuala Langsar, Perak

A TAMIL male, aged 30 years, was admitted to the District Hospital, Kuala Langsar, on 14th April, 1919, for a swelling on the left side of the abdomen, with pain in that region and also on the left flank, and slight cough at night. He also gave a history of passing liquid stools with mucus. These symptoms were said to have existed for about a fortnight only. Later, however, the patient gave a history of having suffered from intermittent pain on the left side of the "stomach" since he was 10 years of age, but this did not disable him from work or cause any other inconvenience until a fortnight before his entry into hospital, when the pain was severe, and a lump was noticeable on the "stomach" region.

*Abdomen inspection*—A tumour was seen on the left side of the abdomen, filling its entire upper half. It extended to about two inches below the umbilicus, above, it was lost under the costal margin. Laterally it extended to the spine, filling the left flank.

*Palpation*—It was smooth and had rounded borders below, at the middle a notch could be made out.

*Percussion*—It was dull in its entire extent, the dullness extending to above the 6th intercostal space.

Deep fluctuation could be elicited. On exploration it was found to contain hemo-serous fluid.

*Operation*—An exploratory laparotomy was performed. The incision was made through the left rectus. On opening the peritoneal cavity, a large cystic tumour (Fig 1) was found to lie behind it, and practically to fill the left side of the abdomen. The descending colon was found tightly stretched over the tumour, which was found to arise from the left kidney. The right kidney having been found to be healthy, the operation for the removal of the left organ was proceeded with.

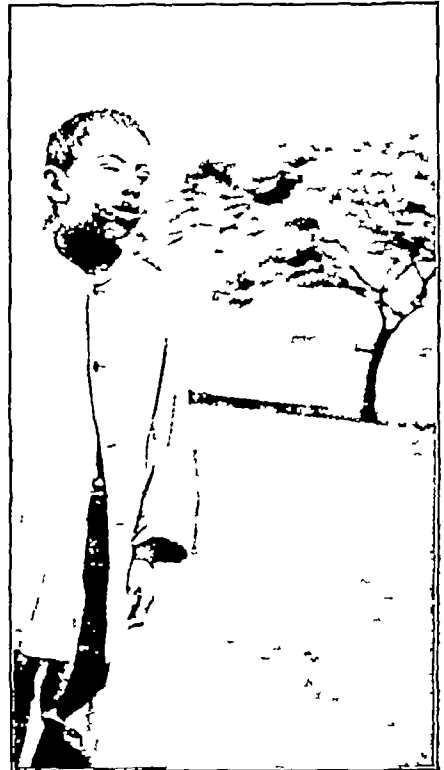
The tumour was incised and 12 pints of clear fluid (measured) were evacuated. Owing to the friability of the tissues and the presence of several adhesions between the tumour wall and the surrounding organs, considerable difficulty was experienced in its removal. The kidney having been freed, the ureter and the vessels were separately clamped and ligatured at the hilus, and the kidney removed. The ureter was found dilated to such an extent that one's thumb easily slipped into it. Very little blood was lost, and there being no further oozing, no drainage was provided. The wound was closed in layers and a permanent dressing was applied. The patient was on the table for about one hour and 45 minutes and stood the operation well.

On 25th April, 1919, the stitches were removed, when the wound was found to be perfectly healed up (Fig 2).

# EPITHELIOMA OF UPPER LIP IN A BOY 14 YEARS OF AGE

By LIEUT COL L P STEPHEN, M.B., F.R.C.S., I.M.S.,

*Civil Surgeon, Karachi*





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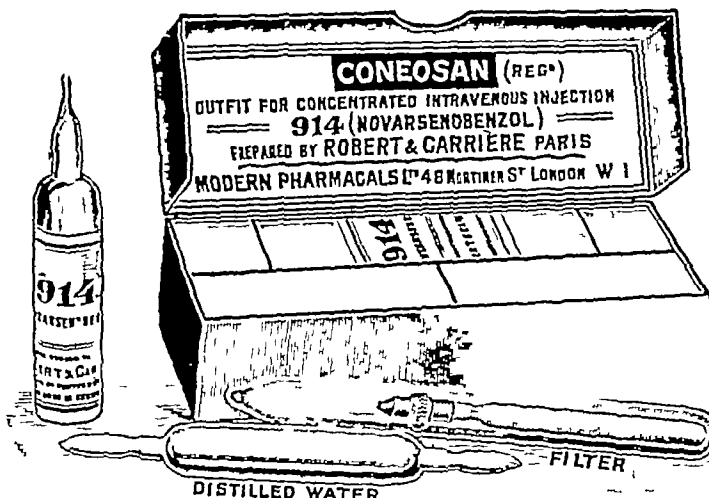
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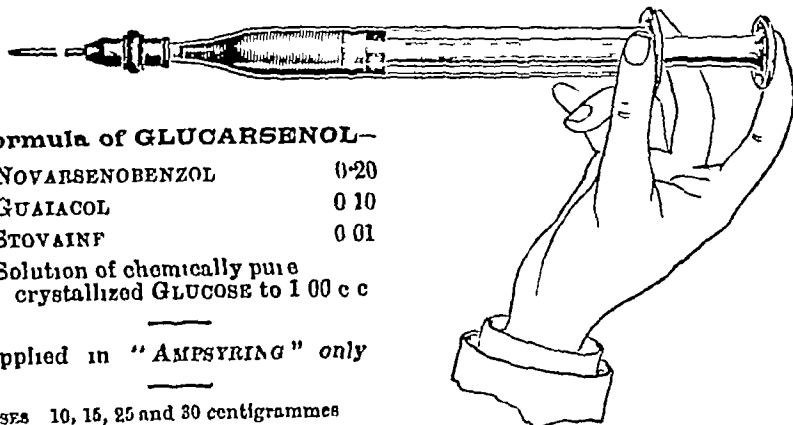
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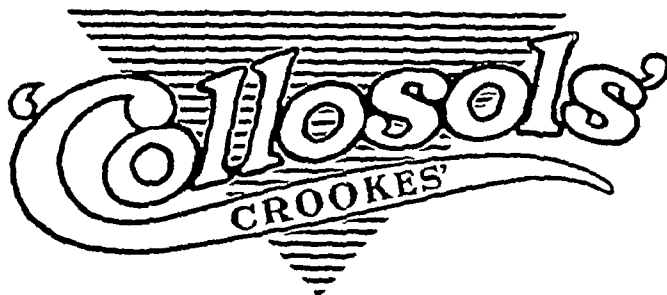
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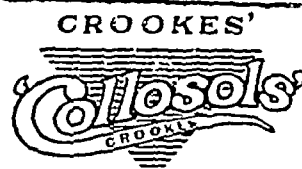
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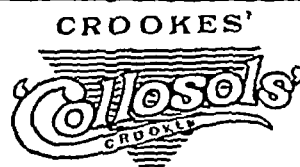
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# Indian Medical Gazette.

JUNE

## PROFESSIONAL MISCONDUCT

NATURI seeks to preserve the species at the expense of the individual,—medical practitioners ought to remember this, and not allow their actions to be influenced by competition. Competition may be the life of trade, but is most assuredly the death of any profession. Where competition is strong and medical ethics are weak, we shall find glaring instances of the desire to belittle a colleague with a view to acquire his patients. Such instances are, we regret to say, too common here in Calcutta. It was only the other day that a practitioner, who had been duly engaged to attend a lady, but was late, having been away from home when the summons came, on his arrival at the house found his way literally barred by another practitioner who had been called to attend to an emergency. The man claimed the case as his own! So far no united action has been taken against him which is a pity. A man who will thus act against a professional brother is not likely to have any scruples where his own interests, as against those of his patients, are concerned. What is required is a Medical Union, in order that such cases may be duly investigated, and the guilty punished by ostracism, for the Medical Council does not concern itself with cases of this kind. Unfortunately the Medical Councils' decisions err on the side of leniency—mercy would be a misnomer—in cases of grave professional misconduct. Recently a practitioner was proved to have given a certificate as to the cause of death without examining the body. The autopsy showed that death was due to rupture of the spleen, and not to the cause guessed at by the practitioner. On his conduct being brought to the notice of a Council, he was censured. Apparently some members of that Council did not realise the gravity of his offence, or were not jealous of the honour of the profession. Had he been in practice in Britain it is certain that he would have had his name removed from the Medical Register and the fact would have been published in every newspaper. Here it has been argued that to publish the decisions of Medical Councils amounts to defamation! We know only too well how the hirelings of the Bar can,

and do, twist the words of any section of any Act to suit their clients, but we cannot conceive that any judge could be such an ass as to hold that a man, who had by his peers been held to be guilty of infamous conduct in a professional respect, was defamed by the fact being made public. In the interests of the people it should be known who is trustworthy and who is not. *Salus populi suprema lex esto!*

## Current Topics.

### On the Effects of Injection of Quinine into the Tissues of Man and Animals

*Jl of Hygiene* 1919 Oct Vol 18 No 3  
pp 317-336 With 1 plate—LEONARD S. DUDGFON

THE author who was Consulting Bacteriologist to the British Salonica Force, was requested to carry out an experimental enquiry on animals as to the effects produced by intra-muscular injections of strong solutions of quinine. Cast mules and horses, rabbits, guinea-pigs and frogs were used and the preparations of quinine were—(a) bi-hydrochloride in saline, (b) acid sulphate in saline (soon abandoned), (c) quinine alkaloid dissolved in alcohol, and (d) in ether. Those most commonly employed were (a) and bi-hydrochloride dissolved in brandy, the quinine solutions were injected in dilute as well as concentrated solution. Control observations were made on the action of acids and ether (quinine solvents) on the tissues of animals. Human muscle was examined from fatal cases of malaria or suspected malaria which had received an injection of quinine at periods varying from one hour to three months from the time of inoculation. The chemical estimations of residual quinine were undertaken by Captain Ferry, R.A.M.C., Analytical Chemist.

The conclusions reached were as follows—

(1) Concentrated preparations of quinine produce more intense necrosis than dilute, but dilute preparations such as are of practical utility excite oedema and necrosis at the seat of inoculation. The difference between these two methods of quinine inoculation is not of sufficient value to justify active opposition to the method commonly employed.

Inoculation of quinine in solutions so dilute as to avoid oedema and tissue necrosis is not of practical utility in the human subject.

(2) A concentrated solution of quinine is absorbed rapidly from the tissues as shown by chemical analysis even in patients who are in *extremis*. It is not apparently stored as such in liver, kidneys or heart muscle.

(3) It is essential to realise that tissue necrosis-spreading oedema and local blood destruction are produced by the solvents employed for quinine administration, and the effects are only slightly inferior to those excited by quinine salts and the alkaloid.

(4) No advantage was obtained by the addition of olive oil or fat or by injecting the alkaloid dissolved in alcohol, or ether, whether in concentrated or in a dilute solution.

(5) Tissue necrosis occurs immediately and persists for a considerable period. In some instances the fibro-myositis which results is associated with a fibro-neuritis which causes various symptoms definitely related to the pathological processes.

(6) Necrosis of blood vessels in the area of inoculation is a common result. This leads to small hæmorrhages into the tissues, and has caused severe



hemorrhages in the human subject and experimentally, from rupture of a large vessel. The destruction of the vessel wall is associated with an accompanying thrombosis.

"(7) An extensive necrosis produced by an intramuscular injection of quinine, in the neighbourhood of an important nerve trunk, may result in nerve palsy. Experimentally, complete degeneration of the great sciatic and other nerves has been produced apart from any direct injury to the nerve at the time of the inoculation. In the human subject this disastrous result may be due to spreading œdema and extensive tissue necrosis.

"(8) Experimentally, no leucocytosis has ever occurred from quinine injections, on the other hand a leucopenia may develop, while an increase of large hyaline cells has been recorded on several occasions.

"(9) No essential differences in the degree of tissue necrosis from intra-muscular injections of quinine in malarial fever or malarial fever associated with blackwater fever were observed.

"(10) Repeated intra-muscular injections of quinine should not be given into the same tract of muscle, or tissue directly adjacent as otherwise permanent injury of muscle or nerves may occur."

The account of the examination of human muscle is of special interest. A few extracts are given.

"A man, comatose from malarial fever, was admitted to hospital, an intra-muscular injection of twenty grams of bi-hydrochloride of quinine was given, but the patient died one hour later. At the autopsy a large tract of black green necrosis about four by four inches surrounded by gelatinous œdema was discovered at the seat of inoculation. Twelve grams of bi-hydrochloride of quinine were injected into the right buttock forty-eight hours before death. At the autopsy a large area of complete necrosis of muscle was observed together with a wide tract of hemorrhage due, as was proved on microscopical examination, to complete destruction of the wall of a large artery. Two intra-muscular injections of fifteen and twenty grams respectively had been made at an interval of twenty-four hours and death occurred about twenty hours later. The resulting lesion was similar in each case—large area of necrosis, a band of hemorrhage and congestion, with a wide tract of gelatinous œdema."

All the cases examined had received concentrated quinine. The author writes—"The fact that necrosis of the tissues always accompanies the intra-muscular or subcutaneous injection of quinine is not realised sufficiently by medical officers. This method should only be employed when circumstances demand it."

[This is an important paper which should be read by all actual or prospective tropical practitioners. These will probably be deterred from ever giving intra-muscular quinine injections. Those, if they have given many hundreds without apparent harm, will continue to give them to selected cases, but assuredly with more circumspection than before. For subjects who are in bad condition or desperately ill the intravenous route would appear to be the better.]—*Tropical Diseases Bulletin*

### The Value of Intramuscular Injection of Quinine in the Treatment of Macedonian Malaria, and some Conjectures concerning Quinine Therapy in general

*Jl Roy Army Med Corps* 1919 Sept Vol 33 No 3 pp 251-261—H W WILTSHIRE

THE author places on record his view of the value of intramuscular quinine in the treatment of malaria originating in Macedonia. He is firmly of the opinion that this method of administration is more efficacious than when the drug is given by the mouth. A 50 per cent solution of quinine bi-hydrochloride was used for the injection and, as a rule, 20 grams of the salt were administered twice daily for four days. On the

fifth day treatment was continued by the mouth, usually 30 grains of quinine sulphate or bi-hydrochloride in solution every day for not less than three weeks. The solution for injection was sterilized in an autoclave three days in succession before use, and again every morning when in use. This did not appear to detract from its therapeutic value. Symptoms of cinchonism are, if anything, more marked after oral administration than after injection, pain at the moment of injection is slight, septic conditions are obviated by good technique and no deleterious action on the heart has been noticed.

It is held that intramuscular injections are of more value than oral administration from the standpoint of (i) *Prognosis of life*, possibly because the drug has a stronger action against parasites in the internal tissues (cerebral type, etc.) (b) *The effect produced during the acute stage* due to greater certainty and rapidity of action. Haematological evidence supports this view. (c) *The chance of effecting a true cure of the disease*, because intramuscular administration is more lethal to spleen and marrow parasites than quinine by the mouth, as evidenced by (1) the great improvement noted in chronic malaria with cachexia and splenic enlargement and (2) the prevention of relapses in cases treated intramuscularly. These showed far fewer relapses than those given oral quinine (55 per cent as against 437 per cent).

The author furthermore records certain "Conjectures concerning quinine therapy in general." It is considered that an unstable quinine proteid compound is the most efficacious in destroying malarial parasites, and experiments of the author and others are cited to show that (a) Intravenous injections of strong solutions give rise to a large amount of unstable quinine proteid compound which is rapidly distributed over the body and produces the most rapid and powerful anti-parasitic effect. (b) Intramuscular injection gives rise to a fairly large production of unstable proteid compound, dissemination of which is, however, comparatively slow. The anti-parasitic effect is correspondingly slow compared to intravenous injection, but it is certain and sure. (c) Oral administration results in a comparatively small production of unstable quinine proteid compound, so that though the dissemination over the body is rapid, the anti-parasitic effect is relatively small.

The author believes that cinchonism is caused by the quinine which circulates in simple solution and not by quinine circulating in combination with proteid, and this suggestion is supported by MacGilchrist's minimal lethal dose experiments. The writer summarizes his conjectures as follows—

"(1) The real anti-parasitic agent is to be found in an unstable combination of quinine with a proteid of the blood plasma.

"(2) The quinine which circulates in the blood in simple solution, and is excreted in the urine unchanged, may be regarded as a waste product, and is innocent of anti-parasitic effect.

"(3) Some of the toxic effects produced by quinine on the body are due to the unchanged quinine which circulates in the blood in a state of simple solution."—*Tropical Diseases Bulletin*

### CHOLERA

#### (i) Recent Researches on the Etiology of Cholera.

*Edin Med Jl* 1919 July Vol 23 No 1 pp 4-22 With 5 charts and 2 plates—E D W GREIG

#### (ii) L'étiologie du cholera.

*Bull Office Intern d'Hyg Publique* 1919 Aug Vol 11 No 8 pp 879-887

A RESUME of a conference held at the University of Edinburgh in May 1919. Many references are given.

to articles which Colonel Greig contributed to the *Indian Journal of Medical Research* for 1913 and following years. Tables charts, etc. are omitted from the French version. Greig's researches extended from 1912 to 1916 and dealt with—

(1) *The effect of the rapidity of transportation on the propagation of cholera*—In addition to transport of infection by roads ships and railways aeroplane traffic may possibly become a source of danger.

(2) *Importance of pilgrimages in India as means of spreading cholera*—The author draws special attention to the immense crowds visiting the temple of Jagannath in Puri and states that during his residence in Puri he examined, bacteriologically, a certain number of cholera convalescents just before they returned to their villages. The result showed that 30 per cent of these pilgrims were infected and excreted the vibrio in their stools. They were mainly travellers by railways returning to their villages in even the furthest parts of India to form centres of infection.

(3) *Carriers of the cholera vibrio*—At the time Greig began his investigations it was generally held that the "comma" bacillus was more or less confined to the alimentary canal but as his work progressed he found that this conception was incomplete. Examination of the various organs in fatal cases showed that the germ had invaded the tissues. The vibrio was present in the gall-bladder in 80 out of 271 cases, and in 12 signs of cholecystitis were visible to the naked eye. A section of the gall bladder demonstrated that the greater part of the endothelial layer was destroyed and vibrios were present in the exposed tissues. In the sub-epithelial layer a reaction of cell growth was observed. Higher magnification showed definitely the presence of cholera bacilli in the deeper layers of the wall of the gall-bladder. Discovery of the germs in the bile was a result of importance because it provided exact information concerning the pathology of carriers. The bile is even a more favourable site for the development of the bacillus than the digestive tube since extraneous germs are absent. In the intestines on the contrary, certain organisms occur which are inimical to the development of the "comma"—*B. pyocyaneus*, *B. proteus*, *B. lactis aerogenes*, *B. faecalis*. With chronic "carriers" the vibrio finds a home in the bile where it may dwell for long periods escaping from time to time into the intestines and outside the body to become the origin of fresh epidemics.

(4) *Production of a "carrier" by experiment*—Live bacilli from cultures were injected into the ear of a rabbit they passed on into the bile from which they could be obtained in pure culture. If a section of the gall-bladder of such an animal is examined the epithelial layer is seen to be damaged and a number of round cells appear in the sub-epithelial layer. The blood-vessels in the walls are congested and under a higher power the germs become visible even in the vessels themselves. If the injections into the veins are repeated further marked changes occur—Signs of cholecystitis and the formation of calculi round a nucleus of bacilli. The author has found biliary calculi containing germs in rabbits which had received the last inoculation a year previously.

(5) *Presence of the vibrio in the lungs*—During the early days of convalescence pneumonia is a common complication, often a fatal one. Sections of the lungs show the alveoli filled with exudation and cells and minute points of consolidation are present. The "comma" can be seen in the cellular exudations proving that the germ can penetrate the pulmonary tissue.

(6) *The vibrio in the urine*—Fifty-five cases were examined and in 8 of these the bacillus was isolated from the urine. Two of these patients had completely recovered and were at work.

(7) *Bacteriological examination of the blood in cholera*—In a certain number of cases attempts were made to isolate the germ but always with negative

results. Dr Greig thinks "it probable that the vibrio passes by way of the lymphatic system rather than through the blood-vessels" [Cf Sanarelli this *Bulletin* Vol 14 p 179]. As the result of these researches the author puts forward "a new conception of the pathology of cholera," viz—That the infection is general and the point or origin is the intestines thus resembling typhoid and para-typhoid fevers. Moreover it seems to him evident that, accepting this new theory, we must revise our ideas on many points which concern the etiology of cholera.

(8) *Agglutinins in the blood*—In many cases the amount of the agglutinins was determined daily from the first day of the illness. In one series of mild cases with rapid recovery the titre of the agglutinins was very high. In fatal cases the antibody response is practically negligible.

(9) *Pseudocholera vibrios*—Since a serum of strong power has been found an important aid in the identification of the vibrio the presence in the excreta of vibrios with characters allied to the type germ complicates the diagnosis. Morphologically these organisms are very like the true "comma" but they are not agglutinated by a serum which will agglutinate the typical germ, they hemolyse the red corpuscles which the "comma" does not affect. These pseudo-"comma" may be—(a) True cholera germs which have lost certain attributes or (b) Foreign bacilli partly "humanised".

Greig has found in Calcutta during the annual return of infection in the spring "every year the same phenomena as the epidemic increased. In the 'rice-water' stools only true cholera vibrios were found'. But as it reached its turning point and during its diminution pseudo choleraic germs began to appear together with the type organisms. And gradually, as the epidemic decreased this race of vibrios became more numerous. Studied from a serological point of view the author was able to arrange these atypical vibrios in certain groups.

(10) *Vitality of cholera vibrios outside the human host*—Upon this point earlier experiments are not quite reliable because in most instances, old cultures were used, cultivated for long periods in artificial media. For such experiments it is essential to use 'non-cultivated' races that is to say, strains not raised in artificial media. Greig employed "comma" bacilli isolated from the 'rice-water' stools. They were preserved in a dark place, in flasks kept at the temperature of the room. The number of germs in the dejections was counted daily until the vibrio was no more seen [see this *Bulletin* Vol 6 p 37]. Temperature plays an important role in the duration of the extra-corporal life of the "comma". In Calcutta during the cold season this life is longer than during the hot season. The critical months are the coldest months because the risk of infection increases owing to this extension of extra-corporal life.—*Tropical Diseases Bulletin*.

### The Balance of Colloid and Crystalloid in Cholera, Shock, and Allied Conditions

*Brit Med J* 1919 Oct 18 pp 490-492—  
BENJAMIN MOORE

As concerning colloids and crystalloids in metabolism normal or abnormal Benjamin Moore writes with authority born of much investigation. Restricted space makes it necessary to abridge this article, but the essential paragraphs will be given in the author's own words. The "texts" are—(1) "a review of a recent work by Richet, Brodin and Saint-Girons (*C R Acad Sci* 1919, p 9) on anaphylactic shock in which it is shown that such shock can be prevented by the addition of sodium chloride to the dechaining dose of serum or by rendering the blood hypertonic with saline before the serum is injected.

(2) "a letter from Sir Léonard Rogers"—see above  
 "Now these two sets of observations [value of intravenous injections of hypertonic saline in cholera, failure of added gum arabic which proved of great value in cases of surgical shock] are by no means contradictory, but most beautifully complementary, also both are in consonance with the findings of the French school on anaphylaxis, and, as will be shown, with the earlier observations from India of Sutherland and McCay (*Biochem J* 1909, p 1) that hypertonic salines inhibit hæmolytic either in a natural hæmolytic system or an actively created one with a specific hæmolytic, as in the Bordet-Gengou reaction and the Wassermann test"

"The common cause of all these phenomena is a disturbance of that delicate equilibrium between the colloids of the blood and cells (such as proteins and lipoids) and the crystalloids (such as sodium-chloride) existing united or absorbed in common solution or suspension"

"Taking first, the positive effect of a colloid such as blood-proteins, gelatine, or gum acacia, in shock due to hæmorrhage, surgical injury or prolonged anaesthesia, as compared with the failure of simple hypertonic salines under these conditions, we find that the situation is one of a circulating fluid not merely defective in total volume but also relatively poor in colloid compared to crystalloid. Accordingly inorganic salts, or salines, given alone are here rapidly eliminated, having no colloid to anchor them, and so being treated as foreign bodies and thrown out by kidneys and intestine. But gum arabic, gelatine and plasma proteins cannot be so expelled, and serve to anchor inorganic salts and so preserve the equilibrium of crystalloid and colloid not only in blood but in the master cells of brain and heart, where the state of aggregation of the protoplasm would soon become altered"

The author then refers to experiments showing interaction by changes of osmotic pressure when the concentrations of salines, in which the colloid is in solution, are varied—*see Amer J of Physiol*, 1902 and *Biochemical J*, 1906. The investigations referred to show —

(1) "That a solution of gum arabic made in water or saline, as recommended by Bayliss, and injected intravenously will at once seize upon or hold a certain amount of saline in the blood, and as a result of its presence the total salt content of the blood with which nerve and muscle cells stand in common equilibrium will rise, and (2) the most important fact that as a result of this absorption the state of aggregation of the injected gum will change so that the "molecular weight" or "solution aggregate" is only about one-third to one-fourth of its former value—for this is precisely what the fall in value of the osmotic pressure means on Avogadro's law"

"Take next the case of efficiency of hypertonic salines in cholera, and inefficiency of colloidal solutions such as gums, and it is clear that this is as it ought to be, for the condition is one of excess of toxic colloids and defect of balancing electrolytes or salines"

"On the other hand free saline in the blood in such diseases as cholera combines with toxins to form a crystallo-colloidal union, and this is an essential factor in excretion of the poison by intestine and kidney. The unattached colloidal molecule of toxin possesses no osmotic pressure, nothing to drive it through an excreting cell. When it becomes attached to a crystalloid the combination acquires a directive force like a gas molecule within a porous pot, and like this now possesses a power of diffusion"

The foregoing principles are next applied to the phenomena occurring in shock, the Bordet-Gengou reaction, the Wassermann test and in anaphylaxis, subjects not strictly relevant to this "Section". Then follow paragraphs of general interest, for an account of which space cannot here be found.—*Tropical Diseases Bulletin*

### Antimony Tartrate for Bilharziasis: A Specific Cure

*Lancet* 1919 June 14 pp 1021-1023—J  
B CHRISTOPHERSON

ANTIMONY TARTRATE has been used as a routine treatment at the Khartoum Civil Hospital since May 1917, and the author now feels justified in maintaining that it is a specific cure, not only killing the adult Bilharzia worms but later also the embryos in the ova in the tissues, and thus eliminates the infected person as a carrier as well as curing him of the disease. In the present paper 30 additional cases are recorded in which the treatment has been satisfactory. The need of caution in the use of the drug is emphasised here as in the author's previous papers. The total amount of antimony tartrate necessary to effect a cure would appear to be less than 25 grs in all. Suspected relapses are due to the gradual elimination of dead ova. Eggs will not hatch after about 12 grs have been given although a marked improvement in the urine is noticeable even on the 5th day when only 3½ grs in all have been injected. Antimony is cumulative in the tissues [Details of treatment are given in previous papers see *Bulletin*, Vol 13, p 206]—*Tropical Diseases Bulletin*

### A Case of *Trypanosoma rhodesiense* Infection which recovered

*Lancet* 1919 Nov 7 pp 829-830—C W  
DANIELS and H B NEWMAN

THE patient was a young man of twenty years. He went to Nyasaland in September 1913, between that date and December 1914, he was frequently bitten by tsetse in various parts of North Eastern Rhodesia. In December 1914, he moved to the frontier of German East Africa where he remained until April, 1915. During this period he was constantly in fly-infested areas. In September 1915, shortly after returning to Fort Jameson, he began to get attacks of what he thought was malaria. Malaria parasites were found, but as quinine did not stop his fever a gland in his neck was punctured and trypanosomes were found.

Whilst in hospital in Rhodesia he had atoxyl, gr 3½, every third day, this continued until he landed in England in November 1915, and came under the care of Dr Daniels. Treatment at first consisted of atoxyl gr 3½ thrice weekly intramuscularly, with antiluetic gr ½ in solution once daily by the mouth. On December 8, 1915, injections of antimony oxide (Martindale) subcutaneously were begun, starting at first with a dose of 30 minims per diem and increasing this gradually until as much as 130 minims were given in 24 hours. The atoxyl and antiluetic were continued although owing to severe nausea it was found necessary to stop the latter drug from time to time. In March 1916, the characteristic circinate rash was first noticed, it lasted about a week, then gradually subsided. As trypanosomes still appeared in the blood from time to time it was decided to stop administration of antimony oxide and to try the effects of repeated intravenous injections of tartar emetic in doses of grs 2½ twice a week. The administration of atoxyl was also discontinued, but the antiluetic was continued. Tartar emetic injections were continued until April 1918. Trypanosomes were seen for the last time on April 6, 1916. Since cessation of treatment the patient has remained in good health. The authors write —

"The case is chiefly remarkable from being the first on record in which one may feel fairly confident that a definite cure has resulted in a true case of Rhodesian trypanosomiasis, and for the really enormous amount of tartar emetic it was found possible to administer. In all the patient had considerably over 500 grs of the drug, and no untoward effects of such administration have manifested themselves"—*Tropical Diseases Bulletin*

### Modern Conceptions of Heart Disease

*The Practitioner* March, 1920—W. EDGECOMBE,  
M.D. M.R.C.P., F.R.C.S.

THE writer referring to the work of MacKenzie Lewis and others points out that the old conception of valvular disease and its after-effects was largely a mechanical one. While infection was recognised as the initial cause the after-effects were explained by interference with the normal course of blood through the heart leading to dilatation, hypertrophy, back pressure and general venous engorgement.

The modern conception places the valvular lesion after infection or poisoning of the heart muscle. If the conducting and contractile muscle fibres are intact and healthy the heart is able to maintain the circulation efficiently for all needs through a long and strenuous life, in spite of permanent damage to the valve and the consequent regurgitation.

In support of this may be mentioned the following facts—

(1) The experimental production, aseptically, of a valve lesion causing regurgitation is not necessarily followed by enlargement or by any change in the muscle.

(2) Cases of frank valvular disease may be found post mortem to show no change in the muscle.

(3) The largest hearts found post mortem are frequently those in which there is no valve lesion discoverable, as in syphilis, renal disease, emphysema, adherent pericardium, and alcoholism.

*Apical systolic bruits*—It follows that a systolic murmur at the apex may be discounted unless there is enlargement of the heart or a definite history of rheumatism. The loudness and character of the murmur, its conduction, give no help, for cardio-respiratory bruits may be equally well conducted through the axilla to the inter-scapular region.

*Mitral disease*—The writer prefers this term to mitral regurgitation or mitral stenosis which are merely different degrees of the same process. While the presence of a systolic bruit is no proof that mitral disease exists, a pre-systolic bruit is definite evidence that the valve is affected and usually connotes a more or less generalized carditis, with damage to the heart muscle, especially the conducting paths.

*Aortic disease*—Similar remarks may be made about aortic disease. In aortic disease the risk of damage to the heart muscle is accentuated by the proximity of the coronary arteries. Hence the greater seriousness of aortic disease.

The foregoing facts are recapitulated as follows—

"In the diagnosis of *organic disease of the heart*—

1 A systolic bruit alone is of no value

2 A systolic bruit with a permanent enlargement of the heart is definite evidence of

organic disease, but it is the enlargement that matters, not the bruit

3 A diastolic bruit is definite evidence of an organic valve lesion, without a permanent enlargement, it is of relatively less import, with enlargement, there is definite evidence of carditis

4 Enlargement, with or without a bruit, is definite evidence of organic disease"

Discussing the functional efficiency of the heart the writer proceeds—

"As the outcome of the foregoing considerations our outlook on valvular heart disease has undergone material change—from the prognostic point of view. No longer are we obsessed by the importance of murmurs when unaccompanied by other and more important physical signs. It has become recognised that the functional capacity of the heart to perform its appointed task is of more importance than the mere structural defects. If the exercise-reaction of the heart is good, the tolerance of sustained exercise equally good, and there is no enlargement of the heart, there is strong presumption that the muscle is undamaged, and systolic murmurs of whatever origin may safely be neglected as of little or no moment. If a diastolic bruit is present, either at the mitral or aortic area, there is certain evidence of structural organic disease, but here, again, if the exercise-reaction and tolerance are good, and there is no enlargement, a good prognosis may be given. More careful watching is required, however, of the future progress of such cases, for there is more likelihood of muscle damage having taken place, or of slow chronic infection going on."

*Rhythm of the heart*—The chief forms of irregularity in rhythm and their separate significance are—

(1) *Sinus irregularity of the young*, in which the stimulus begins at the sino-auricular node and is probably a vagus effect. It is seen typically in respiratory arrhythmia.

(2) *Sino-auricular block*—A relatively uncommon form in which the stimulus arises at the sino-auricular node, but every now and then fails to materialise giving rise to a pause when the whole heart is at rest.

(3) *Extra-systoles*—The type of irregularity is extremely common and usually of little moment. The polygraph will in most cases show whether they are of auricular or ventricular origin, and an electro-cardiogram will determine their exact origin. They usually tend to disappear if the heart is accelerated by exercise or emotion to the inter-scapular region.

If extra-systoles only appear after exertion, they are of much serious import as they indicate some mechanical interference with contraction.

Extra systole may be present throughout life without impairing the efficiency of the heart.

(4) *Paroxysmal tachycardia*—This stimulus to contraction in this case arises in some ectopic

focus in the wall of the auricle. It is characterised by sudden onset, absence of variability in rate to changes of posture or to exercise, and equally sudden cessation after lasting a variable period of hours or days. The pulse is regular throughout.

*Auricular flutter*—The auricle in response to stimuli from an ectopic focus beats at a rate up to 300 beats per minute. The line between paroxysmal tachycardia and auricular flutter is fixed at 200 per minute. The ventricle is unable to respond to a rate of over 240–250 per minute. It is impossible to measure the rate of auricular contraction except by means of the electrocardiograph.

*Auricular fibrillation*—The common irregularity of the failing heart. The pulse is wholly irregular, no two beats being alike. The auricle instead of contracting as a chamber exhibits a tremulous flickering of bundles of fibres. Only some of the ectopic stimuli responsible for these contractions get through to the ventricle, hence the irregularity.

The diagnosis can be made clinically, a polygraph tracing will show the absence of the auricular wave, or a series of small waves due to the fibrillation.

The electrocardiogram will show the absence of the P wave due to the auricular contraction and its replacement by a number of small waves. Fibrillation once firmly established usually endures for the rest of life.

*Ventricular fibrillation*—This is a new conception of the terminal stage of heart failure. Sudden death may sometimes be due to ventricular fibrillation caused, for example, by sudden obliteration of a coronary artery.

*Heart block*—This is a well-known condition, due to disease of the conducting tissue of the heart, the condition may be inferred from a persistently abnormally slow pulse rate and the diagnosis made certain by means of the electrocardiograph or polygraph.

*Pulses alternans*—This condition is best recognised by taking a pulse tracing with an ordinary sphygmograph. It usually indicates a failing myocardium.

### "Toe Rot"—A Rapid Method of Cure

*Journal of the Royal Naval Medical Service*  
Vol V No 4 October, 1919—A O Ross,  
M B, R N

A CONSIDERABLE NUMBER of officers and men who have served abroad, particularly on the China Station, return home with a distressing and chronic complaint, which is termed "toe rot" or gouty eczema. The condition always manifests itself in hot weather and may carry on in winter also. It consists in a necrosis and sloughing of the epidermis between the toes. The skin is most unhealthy, presenting a bleached pale lemon-yellow appearance and has a most disagreeable odour. In some cases fissures appear and these give rise to pain, but as a rule

the patient's chief complaint is the most abominable smell which meets him on removing his boots.

In destroyers one has a very limited choice of remedies, and as three of the four officers on board were applying for relief some potent remedy had to be devised. The Service "antiseptic paste" has an odour, but it is greatly to be preferred to the odour of necrosed skin, so a tube was served out to each of the victims with directions to apply it on alternate nights. The results were astonishingly good. The odour went, the skin ceased to peel off, the fissures healed. All this in ten days! Since then I have used this remedy many times with equally successful results, and I suggest it to all medical officers who are besieged by the victims of "toe rot."

### Cardinal Cardiological Principles

WRITING under this heading in the *British Medical Journal*, November 15, 1919, Lewis gives the 'cardinal points to which attention should be directed in the daily examination of chronic affections of the heart as follows—

1 *The symptoms and signs of cardiac failure*—These are sub-divided into two categories—

(a) *The early evidences of an impaired circulation*—These are constituted by the symptoms which produce distress on exercise. The three chief are fatigue leading up to exhaustion, breathlessness, and pain. In all patients, whether the subjects of actual or supposed cardiac disease, to know the tolerance of physical work is more than half the battle in arriving at a correct estimate of the case. A knowledge of the body's reaction to exercise in health, in ill-health and in the chief forms of heart disease is paramount. The writer does not mean the rise and fall of pulse rate or of blood pressure, they are of service, but those who measure the reaction in this way fail to appreciate the essential—the amount of work which produces distress. A man may have an exhaustive knowledge of electrocardiography, polygraphy, blood pressure, percussion, the stethoscope, and what not, as a practitioner he is better without that knowledge if the first knowledge is lacking. It is of more consequence than the remaining cardinal points, for no patient who has a normal exercise tolerance has grave heart disease, and the gravity of the disease in a series of real heart cases is proportioned to the degree of distress produced by a given amount of work more nearly than it is to any other observable phenomenon.

(b) *The signs of cardiac failure of the congestive type*—These are cyanosis and engorgement as observed in the veins of the neck and in the liver. When present the exercise tolerance is never normal or near normal. The disease is then advanced.

2 *The signs of cardiac enlargement and its degree without attempt to differentiate dilatation and hypertrophy*—Palpation ranks before inspection and percussion. The chief sign is the position and extent of the maximal thrust and the structures it involves.

3 *Signs of valvular disease*—Cardinally these comprise (a) signs of aortic regurgitation which are obtained reliably as often at the pulse as at the base of the heart, and (b) signs of mitral stenosis, of which but two are valuable—namely a diastolic thrill in the apical region and a diastolic rumble of low pitch audible over the maximal thrust, and best heard, often only heard in the recumbent posture after the action of the heart has been accelerated by exercise.

4 *The presence or absence of fibrillation of the auricles*—If the heart is beating irregularly it should be ascertained whether fibrillation of the auricle is present or not. To obtain the last knowledge a few simple tests nearly always suffice.

(a) If there is constant quickening of the pulse during deep inspiration fibrillation is not present.

(b) If the heart beats at a rate of 120 or over, or can be induced by any means to beat at such rates while the pulse remains irregular, fibrillation is almost certainly present. The faster the rate the more certain the diagnosis.

These tests are not exhaustive but they are sufficiently so for general practical purposes. The remaining disorders of cardiac rhythm, either on account of their comparative rarity or because their significance in treatment is far smaller, are not cardinal.

5 *Infection*—No examination is complete until the presence or absence of infection has been fully considered. The chief signs are—

(a) *Pallor*, especially when accompanied by sallowness or duskeness of the facies. This sign is of particular value in aortic disease. Pallor is then of ill omen.

(b) *Palpable enlargement of the spleen*, which is not a reliable sign of engorgement of the viscera, but is usually a sign of active infection of the valves in cardiac cases.

(c) *Petechiae* in the conjunctivæ, mouth, or in skin round the base of the neck and shoulders. They are far more frequent than has been suspected until recently, and should be searched for repeatedly in all sallow cardiac patients.

(d) *Clubbing of the fingers*, which, when slight, is more frequently accompanied by infective endocarditis than by venous engorgement.

(e) *Fever*, constant or only at times.

(f) *A pulse rate constantly over 90 or 100 during rest while the pulse is regular*.

(g) *Gradual but steady loss of weight*.

(a) to (c) are more especially signs of infective endocarditis, a condition which in its sub-acute and chronic forms is much more widespread than is commonly believed, and terminates the lives of a goodly percentage of cases

of aortic regurgitation or mitral stenosis. Signs (f) and (g) are also yielded by intoxications.

6 *When evidence of disease is found, its etiology is to be taken into consideration*—It may be of rheumatic, syphilitic, or other infective origin, or it may result from senile changes. The etiology will control prognosis and treatment.

Instrumental examinations, he writes, are subsidiary methods, useful in checking or revising bedside tests, but essential only in a few patients.

Dr Lewis lays great stress on exercise tolerance as a guide both to diagnosis and prognosis. If a patient takes exercise without undue discomfort has no cardiac enlargement, no aortic disease and no mitral stenosis, he can be told that his heart is sound. On the other hand where there is definite enlargement, aortic disease, or mitral stenosis, or fibrillation of the auricles, the safe course is to attribute any undue distress on exercise to a cardiac lesion. In young subjects, if there is no immediate evidence of heart disease a deficient exercise tolerance should rarely, if ever, be ascribed primarily to the heart. In elderly subjects more diffidence should be shown in the absence of signs of structural diseases as pain, breathlessness or undue fatigue, and often the only signs of grave angina pectoris or myocardial degeneration.

As regards treatment the cardinal principle is to regulate the physical strains thrown on the organ. Work is good as long as it does not provoke undue breathlessness, fatigue or pain. Those acts which cause distress should be prohibited.

The indications for bed treatment are (1) distress caused by rising to the feet or by walking leisurely, (2) active infection, (3) the necessity of drastic treatment by a drug such as digitalis.

The chief value of digitalis lies in its power to control the ventricular rate in fibrillation of the auricles. To the heart digitalis is not a cardiac stimulant but a powerful hypnotic. It prolongs the diastolic periods, during which the heart sleeps.

### Ionization

*The Practitioner*—By MARK WARDLE, L.R.C.P. & S., V.D., Hon Surgeon, Bishop Auckland Cottage Hospital, etc.

HAVING worked at this method of treatment throughout the last year, I have found two outstanding results—(a) its wide range of usefulness, (b) its certainty.

In treating cases with ions some important points must be kept in mind viz—

- Correct polarity,
- Accurate contact of the electrodes,
- Protection of any tender surface by coating with a non-conductor (collodion, for instance)



In treating an area one need not worry about having contact with every portion of it, seeing that ions travel quite a considerable distance beyond the point of contact, for instance, the whole of the surfaces of such a large joint as the knee can be freely "douched" with ions driven from a pad placed over the knee—but much care must be exercised in the protection of delicate parts of the skin, or there will result burns that will take something like two months to heal.

I append notes of some cases, chosen as being the worst of their particular kind, and on account of their diversity of character.

1 *Chronic gouty arthritis of knee*—The slightest movement caused severe pain. X-ray photo showed osteophytes at several points, and considerable denudation of patellar cartilage. *Treatment*—Two per cent solution of potass iodid in pad placed over knee. 50 M A, 30 min alternate days. After first application pain almost gone. After second, patient walked for an hour in comfort. Regular application for four weeks, occasional afterwards. X-ray photo three months after, no osteophytes visible, use of limb normal.

2 *Chronic ulcerative keratitis*—Entire eye-ball inflamed, sight almost nil. Several months' treatment by numerous methods resulted in no improvement, and excision to save the good eye seemed the only thing left. Zinc ions by pad over closed eye. 5 M A, 10 min alternate days. After first application improvement commenced. After seventh, ulcers all healed, no opacity, the rest of eye-ball free from inflammation and sight normal.

3 *Polypoid growth* with extensive granulations involving anterior portion of tympanic membrane and adjacent parts, free discharge of foetid pus, could hear only sharp loud sounds. Zinc ions, 8 M A, 10 min alternate days. Symptoms steadily improved, treatment continued for 20 applications (seven weeks). All growths gone, no discharge. Three months later no return of symptoms, can hear watch.

4 *Chronic rhinitis*—Much foetor and discharge. Zinc ions, 10 M A, 10 min alternate days. Continued for 20 applications. Two months later condition normal.

5 *Spinal curvature dorso-lumbar*—Of many years' standing (tuberculous?). Patient could only move about the room by holding to furniture, and suffered much pain. Iodine ions (sol potass iodid), 50 M A, 30 min alternate days—Pain relieved after first application, gradually disappeared. After twentieth, walks without help and gets up and down stairs.

6 *Carbuncle*—Had reached stage of frequent attacks of severe pain, slough firmly adherent. Zinc ions, 15 M A, 30 min. One application, pain ceased during application. Twelve hours later slough came away adhering to dressing.

7 *Ophthalmia neonatorum*—Baby fourteen days old. Lids of both eyes bulging and inflamed, pus welling out. Zinc ions, 3 M A, 3 min. After first application, eyelids normal, slight amount of pus. After second application, left eye normal, slight indication of pus in right, child can open its eyes freely. No sign of corneal injury.

8 *Sinus after mammary abscess (tubercle)*—Foul discharge. No improvement under various treatment. Running irregular, temperature up to 102. General and pulmonary condition getting steadily worse. Sinus shut up. Zinc ions, 20 M A, 30 min. After first application discharge slight. No foetor. Subsequent improvement steady, temperature normal. Second application given a fortnight later. General and pulmonary condition, a month later much improved.

9 *Inoperable cancer of rectum*—I have already reported this case in the *B M J* (Oct. 18). There is now (November 20) only a slight band of malignant growth at the anus, and I am confidently awaiting the termination of the case to prove that we have in zinc ions an efficient agent for the "cure of cancer."

## Ionic Medication in Cancer.

*The Medical Review* Vol XXIII No 1  
January, 1920.

"M. WARDLE (*British Medical Journal*, Oct 18, p 495) has treated a considerable number of cases of varied character by ionic medication. Impressed by the results, especially by the rapid destruction of carbuncles, he used it in an inoperable case of cancer of the rectum.

A man, aged 74, was admitted to the Auckland Poor Law Infirmary with cancer of the rectum. His age, his bad general condition, and the area affected, negatived any attempt at surgical treatment. The rectum, as high as the finger could reach, was filled by a hard mass, the perineum and the soft parts around the anus, extending laterally to the ischia and behind to the coccyx, were involved and indurated. There were a number of raised points commencing to suppurate, and he suffered from the usual typical attacks of severe pain. Having found that the excruciating pain of carbuncles is removed by one application of zinc ions, and influenced by the favourable effect of copper ions on lupus, the writer tried treatment by copper ions in the hope of at least relieving the pain without opium. The first application was made on July 8, and from that day until the twenty-fourth dose he was much relieved of pain, but in other respects remained in *statu quo*.

Zinc ions were then tried, and after one application pain ceased. On October 6, after 17 applications, his condition was as follows—The anus presented a ring of hard growth, the rectum, as far as could be reached, was soft and normal. All the induration of the perineum and surrounding area had disappeared and only one suppurating point—the largest—remained, but was much reduced in size. The old man was able to get up and walk about, and felt "quite well." His general condition was much improved.

The method adopted was as follows—The rectum was packed with a tampon of wool soaked in a 2 per cent solution of zinc sulphate, the depressions around the anus were packed so as to make the whole surface level, and a pad of 16 layers of lint applied, covering all the diseased structures with sufficient pressure to ensure accurate and equal contact throughout. The active electrode (positive) was attached to the pad, and the indifferent (negative) to the lumbar region. The current employed was 60 milliamperes for 30 minutes on alternate days.

This case proves that zinc ions relieve pain, and not only check malignant growth, but destroy it."

## Inequality of the Pupils in early Syphilis.

*The Medical Press and Circular* January 21, 1920.

"INEQUALITY of the pupils without the Argyll-Robertson sign may be observed in all

stages of syphilis. The periods of its occurrence are variable in the course of the infection. The earliest time is during the fourth week from the onset of the primary sore, then later during the secondary stage, and later still in the tertiary. Adamson (*British Journal of Dermatology and Syphilis* Vol XXXI Nos 10-12) quotes S. Nicolau to the effect that this inequality of the pupils is often permanent, but that the persistence of the sign should not be regarded as definitely constituting a menace to the patient's future. Nevertheless, inasmuch as the lesion probably indicates some involvement of the nervous system it is one that should be carefully watched while it is advisable not to lose sight of patients who have early inequality of the pupils. Diagnostically it is also a valuable sign in cases of latent or doubtful syphilis. Early inequality of the pupils may co-exist with early lymphocytosis of the cerebro-spinal fluid, not only in the secondary period, but in the primary stage."

### The Effects of Multiple Embolism of Pulmonary Arterioles

*Quarterly Journal of Medicine* Vol XIII No 50 January, 1920—J. S. DUNN

THE intention of the research outlined in this paper was to determine the effects on the circulation and respiration of mechanical blockage of the pulmonary arterioles. It is known that pulmonary irritant gases at a very early stage cause thrombosis of the capillary blood-vessels in the lungs, but it is uncertain to what extent the restriction of the pulmonary circulation thus brought about is responsible for the symptoms.

The animals used were chiefly goats and the substance employed to produce embolism was an emulsion of freshly prepared potato starch. This had the great advantage of not passing into the systemic circulation.

The starch emulsion was introduced into the jugular vein or into the right ventricle.

The results of the experiments are best described in the author's own words.

The methods adopted in this research are believed to provide, at first, an uncomplicated condition of multiple embolism of pulmonary arterioles. There is no reason to believe that any of the results which have been observed are due to lodgement of emboli in other organs than the lungs. In this respect these results may differ from those produced by experimental oil-embolism in animals, or from the phenomena of fat-embolism in the human subject. In the later conditions a considerable amount of the embolic material passes through the pulmonary capillaries, and, entering the systemic circulation, may cause lesions in the brain and elsewhere.

Where a large dose of starch emboli causes sudden death it apparently acts in a very direct fashion. The arterial blood-pressure falls almost at once to a fatal level, and the pressure in

the large veins rises simultaneously almost to the same figure, so that the circulation is brought to a standstill. It appears as if the passage of blood from the right to the left side of the heart were almost completely cut off in the lungs. There is also no doubt, from histological examination of the lungs in these animals, that the degree of obstruction of the pulmonary arterioles is very great.

Where the dose of starch is sufficient to cause sudden death, the blood-pressure in the right heart and great veins shows at most a transient rise immediately after the injection. Afterwards the venous pressure has been observed to remain at normal level for more than three hours in unanæsthetized goats, although during that time the animals showed symptoms of acute illness. The arterial blood-pressure, which has been recorded only in animals which were under the influence of a general anæsthetic, has remained at or above the normal level for an hour after similar doses. This maintenance of pressure during the first hour is of more significance than the subsequent fall, for there is no doubt that the anæsthetized animals die sooner after embolism than the unanæsthetized. From other experiments it would appear that there is no great permanent diminution in the amount of blood which passes through the lungs per minute with this order of dosage.

The maintenance of the arterial pressure and of the blood-flow in these experiments is all the more remarkable when it is considered that the vessels which are blocked are mainly arterioles and not capillaries. Whereas for any single occluded capillary the alternate routes are practically infinite an arteriole is an end artery on a small scale, and represents a definite division of the main pulmonary artery, so that its whole function cannot be adequately taken over by any other vessel. In these facts we have definite evidence of a *very considerable reserve of vascular area in the lungs*. We know that a large number of pulmonary arterioles can be occluded and yet leave the circulation substantially maintained, at any rate for the resting animal. Therefore, more blood must pass through the unobstructed arterioles than they are normally called upon to accommodate. Theoretically this result might be attained in any one of three ways: (1) by diminution in the viscosity of the blood, (2) by increase of pressure in the pulmonary artery, and (3) by dilatation of the unobstructed vessels. It has been shown by estimation of the hæmoglobin that there is no diminution of the concentration of the blood and therefore of viscosity, and direct measurement has shown no lasting rise of systolic pressure in the right ventricle, so we are driven to the third conclusion that the pulmonary arterioles are dilated to provide compensation. In other words, we have indirect evidence that *the amount of blood which passes through the pulmonary arterioles is subject to regulation apart from that*



*which is obtained by alterations in the pressure of the blood in the pulmonary artery*

From the above considerations it would appear that the blockage of capillaries by thrombi in gas poisoning does not by itself constitute a serious obstruction to the circulation. In that condition, however, it is associated with other factors, such as pressure of alveolar fluid on the capillary walls, increase in the viscosity of the blood, and possible alterations in the texture of the endothelium in non-obstructed capillaries, and in the production of the total deleterious effect it may have a substantial share.

The peculiar form of dyspnoea caused by embolism is of special interest in that it appears to be determined by nervous influence. It follows almost immediately on introduction of the obstructive material, and the degree of its development may be quite disproportionate to the dose of emboli injected. The form of the dyspnoea is similar to that which rapidly followed inhalation of pulmonary irritants, and the two are in so far analogous that they are fully established before there is any production of œdema or other visible organic change in the lungs, and certainly long before there is any mechanical interference with the ventilation of the alveoli.

When death results from the less severe doses of emboli it is found that the primary obstruction of vessels has become complicated by secondary pathological changes in the lungs. These may also be observed in process of development in animals killed at intermediate periods. They comprise pulmonary œdema mainly interstitial, but in part alveolar, and spastic contraction of the atria and infundibula. The addition of these to the vascular blockage probably determines the late desaturation of oxygen in the arterial blood and ultimately the death of the animal.

The pulmonary spasm produced by embolism resembles in general that which is occasionally observed in gas poisoning, but differs in its time of incidence. In gas poisoning it is an early phenomenon, and it may, though rarely, be so complete and effective as to cause death within fifteen minutes of exposure to gas. The spasm of embolism has not been observed less than an hour after the start of the experiment, and even then it sets in gradually and only attains a maximum when death is imminent. The significance of this change is uncertain.

### The Pathology of "Influenzal Pneumonia"

*Boston Medical and Surgical Journal*—F. P. McNAMARA, M.D.

THIS paper is based on the results of 95 post-mortem examinations performed at the Brady Laboratory of Pathology at the New Haven Hospital, Connecticut.

The writer, briefly referring to the etiology of influenza, states that while we do not know

the cause of influenza, there is a general consensus of opinion that it is not primarily due to the influenza bacillus. The most promising work is that of English and French investigators who have found a filterable virus in the blood of influenza patients, which when injected into monkeys produces a hæmorrhagic condition of the lungs.

The features noted on external examination of the body were plum colouration of the face, neck and upper extremities, frothy, blood-tinged fluid bubbling from the nose and mouth, jaundice due to increased destruction of red blood cells and cloudy swelling of the liver, and lastly intense rigor mortis.

On opening the thoracic cavity a slight excess of blood-tinged serous fluid was usually seen. There was sometimes fibrin but rarely purulent fluid.

The trachea and larynx were of a deep red colour and frequently showed punctate hæmorrhages. Superficial ulceration was common. An exudate of clear or faintly blood-tinged mucus with some fibrin was often seen.

The lesions in the bronchi and bronchioles are more intense and vary with the duration of the disease. In the early cases the lumen contains serum and mucus, the submucosa is congested and œdematous, while the epithelial cells are more granular than usual. More advanced cases show hyaline necrosis of the epithelium which may be absent in places, baring blood-vessels and leading to hæmorrhage. Bacteria, red-blood cells, and cellular debris are abundant. The necrotizing process may extend through the wall of the tube and lead to peribronchial pneumonia or actual abscess formation. When repair takes place contraction of the fibrous tissue may lead to obliterating bronchiolitis and bronchiectatic cavities. Owing to the number of actively dividing young epithelial cells the histological picture is like that of carcinoma.

The writer divides the lungs into three groups. The first, an acute fulminating type characterized by intense congestion, a tendency to hæmorrhage into the lung, an aplastic serous or sero-fibrinous exudate in which bacteria abound and hyaline necrosis, slight or great in extent, of the terminal bronchioles, and of the alveolar walls. Interstitial emphysema results from rupture of the latter structures.

In the second type the process tends to become localised, necrosis is marked. The lung retains its increased volume, but the consolidation is more liable to involve the lower portions of the lungs. In general the distribution is lobular. On section the most outstanding feature is thick pus welling from all the bronchial tubes.

The latter are dilated. The consolidation is patchy. Small and large abscesses may be seen, actual gangrene is sometimes encountered.

The third type includes those cases which survive a considerably longer time. Organization of the bronchiolar and alveolar exudate is

the prominent feature. Unlike lobar pneumonia this led to obliterating bronchiolitis and the formation of bronchiectatic cavities, as well as large areas where the alveoli were filled with granulation tissue.

The extra pulmonary lesions most commonly found were dilatation of the right heart, acute splenic tumour, cloudy swelling of the viscera, hemorrhages in the adrenal bodies, in the rectus muscles.

The organisms found were pneumococci, streptococci, the "influenza" bacillus, staphylococcus aureus, bacillus pneumoniae and micrococcus catarrhalis.

The pathology may be briefly summed up as follows —

"We have a disease of unknown origin but one which undoubtedly affects the upper respiratory tract and which may be primary in the lung itself. Acute laryngitis and tracheo-bronchitis result. Because of the injured trachea the mouth organisms gain access to the lung, perhaps already injured, and there set up a diffuse pneumonia. The latter is characterized at first by oedema, congestion, hæmorrhage and hyaline necrosis of the bronchiolar and alveolar walls. Later the process tends to localize the necrosis of the lung, varying in degree from milary abscesses to actual gangrene results. If the patient survives, organization of the interstitial, bronchiolar and alveolar exudates results in fibrosis of the lung, obliterating bronchiolitis and in the formation of bronchiectatic cavities. The bronchiolar epithelium proliferates in this disease as in no other and has the histological characteristic of an epithelial neoplasm."

### The Technique of Citrated Blood Transfusion

*The Boston Medical and Surgical Journal* Feb 1920—MAJOR H. C. MARBLE, M.D., M.C. (U.S.A.)

THE writer states that "the transfusion of citrated blood now seems to have taken a very definite place in the surgical world. Its advantages over other methods are numerous, its therapeutic results are identical and when carried out with careful, painstaking technique it is safe, accurate and sure. Thousands of these transfusions were carried out in the A. E. F. with remarkably good results."

The following points must be borne in mind in performing citrated blood transfusions —

- "(a) The recipient must be carefully typed
- "(b) The donor must be carefully typed and if time permits a Wassermann reaction done
- "(c) Only donors of the same or higher types than the recipient shall be used
- "(d) Blood is a fragile tissue, the processes of coagulation begin almost instantly when the blood leaves the vein, therefore, the blood must pass quickly, easily and cleanly into the sodium citrate solution and be immediately mixed with it before coagulation begins

"(c) Having obtained the blood and having carefully mixed it with sodium citrate, the process of administering it to the recipient may be carried out much more leisurely than in other methods, the problem of coagulation having been eliminated."

If known types are not available the following method of determining compatibility may be used —

"Draw the blood from the recipient as for a Wassermann reaction. Allow to clot and the serum to separate. Pipette off the serum and centrifuge until clear. Add normal sodium citrate solution (3.8 per cent) in the proportion of one part to ten parts serum.

'Use this as a type serum. Mix it with blood from donors as before, rejecting those that agglutinate."

*Drawing of blood*—The apparatus required is as follows —

A graduated 1,000 c.c. flask drawn out at one end to fit a short rubber tube about 2 inches in length.

A short clean needle, 14 to 16 gauge.

A long glass stirring rod.

*Procedure*—The usual procedure for puncturing veins is adopted. The needle may be introduced directly into the distended vein (Median basilic) or through a small transverse incision. 50 c.c. of freshly made sterile isotonic sodium citrate solution (3.8 per cent) is introduced into the apparatus before puncture. The blood is allowed to rise in the flask while an assistant stirs the citrate solution in.

50 c.c. of the citrate solution is sufficient for 500 c.c. of blood. If more or less blood is required the amount must be increased or decreased in proportion.

*Introduction of blood*—The same flask filled with the citrated blood is used. This is attached to a 19 or 20 gauge needle by a rubber connecting tube 3 feet long with a glass window near the distal end. The blood is allowed to flow in by gravity. It is a good practice to stop after 30 c.c. have been introduced to note possible symptoms of hæmolysis. These are —

(a) Shortness of breath, (b) intense flushing of the face sometimes with urticaria, (c) pain in abdomen or back, (d) vomiting. According to the writer hæmolytic reactions are rare. Slight chills occurred in a small percentage of the cases.

The advantages of the citrate method are summarized as follows —

- "(a) The whole apparatus may be sterilized by boiling and may be used repeatedly. I have performed four transfers of blood in one afternoon with a single apparatus. Following each transfer the apparatus was washed in cold water and re-boiled. No further preparation is required.
- "(b) In drawing the blood if there is clotting in the needle a new one may be substituted without losing or harming the blood already drawn.

"(c) Citrated blood will keep several hours if necessary

"(d) The blood may be drawn in the operating room, carried to the ward in the flask and there introduced into the patient

"(e) The therapeutic results as compared with other methods of transfusion are identical

"(f) The whole operation may be done easily, surely and without haste

"(g) The blood may be administered through a very small needle without incision, which is of value in hemorrhagic patients who often bleed from the wound"

### Further Studies on the Use of Water-Soluble B in the Treatment of Infant Malnutrition

From the Society of the New York Hospital, New York—By WALTER H EDDY

RESULTS of experiments were reported confirming previous work of the author in stimulating growth by the addition of B vitamin extract to the diet of infants suffering from malnutrition of the marasmus type. A new feature used in the study was the application of the Bachmann test to measurement of dosage.

In experiments with vitamin prepared from the navy bean by the McCollum method the test detected relatively small amounts of vitamin and while in need of further standardization, offered a valuable aid in measurement of the vitamin B present in the substances used. Tables were shown giving the result of the test on various amounts of the dextrin-vitamin mixture and on other substances such as milk, both cow and human milk.

The first case, showing stimulation with the B vitamin gained an average of 0.84 ounce per day in a 32-day period as against a gain of 0.47 ounce per day during 17-day period preceding the use of the vitamin through the calorie intake and the food given remained constant through both periods. The second case showed a similar stimulation though not so well controlled as the first. The interesting feature of the use of the Bachmann test as applied to the first case was the result of the tests as applied to the child's diet and to the extract. The diet was found to contain 2,120 units of vitamin and the stimulating mixture only 70 units. In other words, an increase of only 3 per cent in actual vitamin intake produced the marked stimulation. The author suggested that this result may be due to the fact that the child could utilize the vitamin in the diet and that the way the vitamin is held in a diet may be an important factor. In all the baby cases treated the extract feeding is followed by an increased growth, which continued to a point where removal of the extract is possible without marked reduction in the growth rate, and the child then goes on to recovery.

These cases represent the fifteenth and sixteenth showing stimulation under this treatment—*The Journal of Biological Chemistry* Vol XLI No 3

### Preliminary Observations on the Relation of Bacteria to Experimental Scurvy in Guinea-pigs

From the Research Laboratories, Western Pennsylvania Hospital, Pittsburgh—By MAURICE H GIVENS and GEORGE L. HOFFMAN

Whether or not bacteria play any rôle in the development of scurvy in guinea-pigs has not been settled by direct evidence. Jackson and Moore found coccus-like bodies in microscopic sections of lesions in scorbutic guinea-pigs. Jackson and Moody isolated from the diseased joints, muscles, and lymph glands of these animals gram-positive and gram-negative organisms. Pure strains of these bacteria introduced into guinea-pigs gave rise in most instances to hemorrhagic and other lesions in the bones, joints, muscles, lymph glands, and organs. Torrey and Hess concluded that scurvy, both of guinea-pigs and of infants, was not associated with an overgrowth of putrefactive bacteria in the intestinal tract.

We have attempted to throw further light upon the question by bacteriological examinations of the blood, joints, and feces of guinea-pigs made scorbutic on different diets and then treated with different antiscorbutic foods. Blood from scorbutic animals anesthetized and from those dying of the disease regardless of the diet producing the same has been found to be sterile. The enlarged front joints of guinea-pigs developing scurvy on oats alone were sterile, this was likewise true in the majority of cases of guinea-pigs developing scurvy on the soy cake food of Givens and Cohen. However, in two or three instances a staphylococcus and diplococcus were isolated. Pure strains of these organisms injected intracardially, intraperitoneally, and into the joints of healthy guinea-pigs on a mixed diet produced no signs of scurvy. Smears and cultures were made of material from different parts of the intestinal tract of guinea-pigs on oats alone, on oats plus lemon juice, 3 c.c. daily, after scurvy developed, on the soy cake diet, and on the same plus cabbage after the appearance of scurvy. No marked difference was found in the intestinal flora under any of these conditions—*The Journal of Biological Chemistry* Vol XLI No 3

### The Rôle of Fat-Soluble Vitamin in Human Nutrition and its Suggested Relation to Rickets

From the Bureau of Laboratories, Department of Health, New York—By ALFRED F. HESS

It has been shown that the fat-soluble vitamin is an essential constituent of the dietary

of rats. There have also been clinical reports attributing marked malnutrition in infants and children to a lack of this dietary factor (Japan, Denmark). As a result of these experiences it has been accepted that this vitamin is highly important for man, and that the lack of it leads to nutritional disorder in children. This has been emphasized all the more as this vitamin is not nearly so widely distributed in nature as is the water-soluble vitamin. In order to study this question five infants, varying in age from 5 to 12 months, were given a diet which was complete except for a very small amount of fat-soluble vitamin. It consisted of 180 gm. daily of highly skimmed milk ("Kryсталak" 0.2 per cent fat), 30 gm. of cane sugar, 15 to 30 gm. of autolysed yeast (to supply water-soluble vitamin), 15 cc. of orange juice, 30 gm. of cotton-seed oil, and cereal for the older infants.

On this diet the children have done well for a period of 8 to 9 months. They have shown no anemia, no eye trouble, no bone changes, as seen by the X-ray, nor has their growth in length or in weight suffered. We believe, therefore, that either a very small amount of this vitamin suffices to supply the needs of human nutrition, or that this deficiency has to be maintained for a period of years in order to bring about any harmful result. Danger from a lack of this dietary factor need not be apprehended if the diet is otherwise complete.

The development of rickets has been attributed by Mellanby, as a result of experiments on dogs, to a lack of fat-soluble vitamin and Hopkins and Chick have termed this vitamin the "anti-rachitic factor." It was found, however, that infants fed on this "fat-soluble vitamin minimal diet" did not develop the well-established signs of rickets—beading of the ribs, enlargement of the epiphyses, the weakness of the muscles, etc. We cannot believe, therefore, that rickets is brought about merely by a deficiency of this principle, all the more so, as this disorder developed in infants receiving large quantities of milk containing ample fat-soluble vitamin. It may be added that neither cream nor the leafy vegetables, both of which are rich in this principle, are comparable to codliver oil as growth stimulants.—*The Journal of Biological Chemistry* Vol XLI No 3

### The Etiology of Rickets

From the Laboratory of Chemical Hygiene, School of Hygiene and Public Health, the Johns Hopkins University, Baltimore.—By E. V. McCOLLUM, NINA SIMONDS and HELEN T. PARSONS

"We have conducted an extensive series of experiments with rats restricted to diets derived from cereals and legume seeds, cereals, legume seeds, and muscle meats, and with similar diets in which degerminated products of cereal

grains replaced whole seeds, and have supplemented these mixtures with purified food substances to determine the nature and extent of their dietary shortcomings.

In these experiments we have observed the gross picture of rickets in many of the animals restricted to faulty diets, and have demonstrated that this condition develops on diets in which the faults lie in several different factors.

A low content of fat-soluble A, low calcium content, poor quality of protein, and unsatisfactory salt combinations, acting in combinations, may all contribute to the etiology of the disease. We have not yet completed our observations on diets in which but a single factor is at fault. It is certain that specific fasting for fat-soluble A cannot be regarded as the sole and only possible cause of rickets.

Since the same gross picture can be induced in several different ways, we are led to suggest the possible occurrence of more than one kind of rickets. Histological studies of tissues of animals suffering from what appears to be rickets, but from different causes, are still in progress. No decision can yet be reached as to whether in all cases the histological picture is the same in animals exhibiting beaded ribs, enlargements of the costochondral junctions, deformity of the thorax, and general deformity of the body, irrespective of the dietary factor or factors which brought about the condition.—*The Journal of Biological Chemistry* Vol XLI No 3

### "The Control of Hæmorrhage by Intramuscular Injection of Calcium Chloride

*Guy's Hospital Gazette*, p 159—W. R. GROVE

THE value of the salts of lime in increasing the coagulability of the blood is well known, but it is not so well known that their absorption from the intestine is very slow and minute. Professor Dixon pointed this out, saying that practically all the salt could be recovered from the feces, and he suggested its hypodermic use in a dose of one grain. In a troublesome case of hæmoptysis the writer gave in the forearm a grain of calcium chloride diluted with 20 minims of water. The result was immediate and perfect, but a patch of gangrene of the size of a sixpence developed at the site of injection, which sloughed away and gradually healed. The patient, rid of his hæmoptysis, thought the scar a small price to pay.

The writer has always at hand a 1 in 4 solution of the fused calcium chloride. In hard water there is a precipitate, but this is shaken up and 4 minims of cloudy fluid are drawn into the syringe and boiled hot water is drawn up afterwards to the 20-minim mark. This is injected deeply into the gluteal muscles. The injection is painless.

In hæmoptysis the injection always acts like a charm, and so certain is the result that when pressed for time the writer assures the friends that the bleeding will stop and tells them not

to expect to see him for two days, unless they send. In all cases of hæmorrhage when it is impossible to reach the bleeding spot the injection is invaluable. In hæmatemesis it has acted in the same way. In certain cases of metorrhagia it has been useful, and good results have been obtained after the oral administration has had no effect. After abdominal hysterectomy in an extremely fat woman there were signs of peritoneal hæmorrhage with collapse distension, and oozing from the incision, and presumably a ligature had slipped. The surgeon could not easily be got at but after an injection of calcium chloride all the symptoms gradually subsided, and she recovered without the wound having to be opened up. In a case of aortic aneurysm two injections were given, at about a fortnight's interval. The patient is apparently getting better since the bruit has almost disappeared and the dulness is decreasing. In many other cases the method may prove useful, e.g., when the diagnosis of a ruptured extra-uterine pregnancy is made in the anxious time before operation, in typhoid hæmorrhage, in anticipating secondary hæmorrhages, in war work, and as a preparation for certain operations. The writer always keeps a small bottle in his emergency and midwifery bags.

One warning—once one of the writer's house-surgeons, out of his imperfect memory, injected 10 grains instead of one, producing a terrible femoral thrombosis and gangrene. But with one grain as the dose no harm has resulted."

VICTOR PAUCHET, in the *American Journal of Surgery*, 1920, 34, 1, notes that spinal anæsthesia improves the prognosis in cases of intestinal obstruction, since it causes intestinal contraction, releases the abdominal wall and does not cause vomiting. In his opinion, it should *not* be employed in cases for which local anæsthesia is sufficient—varicocele, hæmorrhoids, perineorrhaphy, prostatectomy, goitre, cancer of the tongue, osteotomy of the femur and amputation of the foot, etc., being reserved for major operations. He believes that plugging the patient's ears and blind-folding him are useful preliminaries, joined with the injection of scopolamin-morphine and a cardiac stimulant one hour before the operation. If the tension be low 10 cc of fluid may be withdrawn, if it be high 25 to 30 cc should be taken—the first few drops being allowed to flow into the ampoule containing the anæsthetic powder. The dose of anæsthetic required varies with the operation, the quantities being in the ascending scale for foot, thigh, acum uterus, ulcers, stomach, kidney, liver, from one-third to a whole ampoule corbiere, which contains 06 gr procaine with 03 gr cocaine.

3 cc of the prepared solution are injected, then the cerebrospinal fluid is again aspirated and again injected and so on to ensure thorough diffusion, which is aided by making the patient

cough. The injection should be made slowly—and should take several minutes. First the skin and then the underlying tissues down to the vertebral column are infiltrated with 1 200 solution of procaine—when this is done a large needle may be used for the spinal puncture without causing any pain. The seats of puncture are in the middle line (a) between the 12th dorsal and 1st lumbar vertebræ—the spot being on a line uniting the lower borders of the 12th ribs, (b) between the 2nd and 3rd lumbar vertebræ, and (c) between the 5th lumbar vertebra and the sacrum—this is the largest space, and there is no chance of wounding nerve tissue if the needle be thrust in the middle line.

In hysterectomy for uterine cancer, as the operation is likely to last a long time, the abdominal wall should also be anæsthetised by infiltration of an area of the width of the thumb from the umbilicus to the pubes. For this a 1 per cent solution of the hydrochloride of quinine and urea is used, and has the advantage of causing loss of sensation of the part which lasts several days, thus adding to the patient's comfort after operation. The skin cicatrix will be indurated for a long time, but this does not matter—and can be bettered by the patient massaging the part with her fingers later.

In Pauchet's opinion, surgeons who prefer general anæsthesia to spinal anæsthesia for Wertheim's operation are wrong—the dangers are the same, but the operation is easier under spinal anæsthesia because the abdominal wall is well released, the abdomen is quiet, and the patient does not push out her intestines by straining. In cases of uterine cancer the mortality is lower with spinal anæsthesia because the operation can be done more easily and more thoroughly.

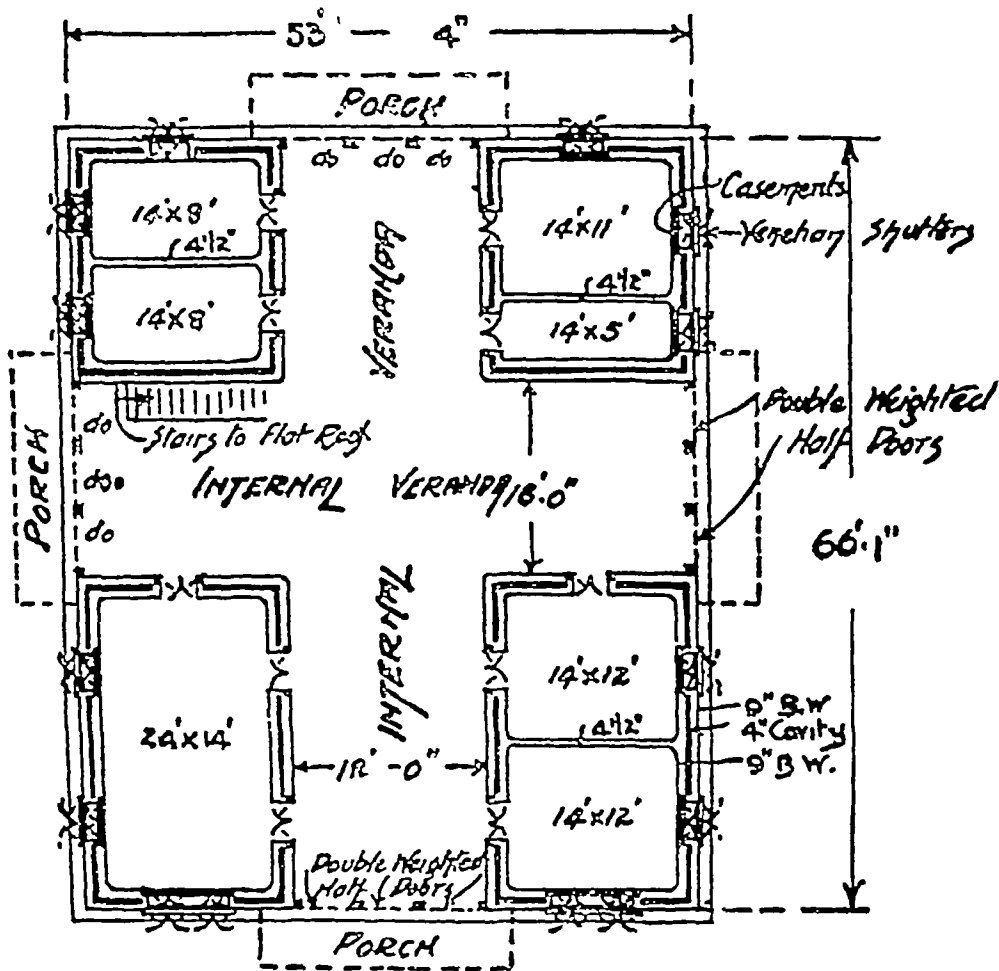
*Burn-blebs and their treatment*—Ziegelman and Mangan recommend that the blebs should be carefully aspirated and then filled with a 4 per cent solution of sodium bicarbonate. The blebs may again be aspirated and refilled after 4 to 8 hours. Great care must be taken not to break the skin, and if dressings be required, the bleb should be covered with ambrine, or the dressings should consist of paraffin gauze. They point out that the serum contained in burn-blebs is toxic, and must be removed (*Am Journal of Surgery*, 1920, 34, 10).

*Incomplete abortion*—King points out the utter impossibility of sterilising the vagina and cervix, and the consequent danger of using the curette in cases of incomplete abortion. He uses a sponge-forceps to remove the uterine contents, and then by its means introduces a sponge which is twisted round the uterine cavity to bring away anything that may have been left. As an indication that all has been brought away the cessation of bleeding is valuable. Should bleeding persist, as it does in rare cases,

the canal is packed otherwise nothing is done—no douches, no chemical applications. "The after-treatment is simply rest, local and general for three to six days. The patient is allowed up as soon as the uterus has involuted well and she is discharged two or three days later"—(*New Orleans Med and Surg Journal* 1920, 7, 540)

In the *Annals of Tropical Medicine and Parasitology* (1920 13 pp 313-336 and 351-412) there are articles on the metabolism of white races living in the tropics and tropical Australia and its Settlement, which are well

the skin and its coverings, was carefully estimated by two thermometers, wet-bulb and dry-bulb, which were prevented from touching the skin by being enclosed in a small wire cage, and the results corroborated Rubner's remarks that a clothed man always lives in a tropical climate as far as his body is concerned. Incidentally it was found that the temperature in the rectum was, in the hot season, between 98.8 degrees and 99.4 degrees F and in the cool season between 98.2 degrees and 98.7 degrees F when the subject was at rest indoors, out of doors the rectal temperature ranged between 98.6 degrees and 99.7 degrees F, and when walking and carrying a load of 13 kilos for fifteen min-



C. D. LYNCH  
ARCHITECT

worth reading. In the first article Young details elaborate experiments made to ascertain the influence of external temperature and the rate of cooling upon the respiratory metabolism. Carried out as these experiments were on persons actually living in the tropics, they have much more value than any experiments carried out under artificially produced "tropical" conditions. The skin-shirt temperature, *i.e.*, the temperature of the layer of stagnant air between

utes on the flat at the rate of three miles per hour, it went up to 100.2 degrees F.

The loss in body weight during walking exercise when the dry-bulb registered 87.8 degrees F and the wet-bulb 79.7 degrees F after an hour's walk was 740 g—solely due to profuse perspiration. This, Young says, and we agree with him, shows how necessary it is to supply the body with sufficient water in the tropics. Years ago, we heard an old *shikari*

asseverate that the less water one drank the better when one was after tiger in the hot weather. He may have suffered but little inconvenience from acting on this precept, we found it to be physically impossible to cut down the quantity of fluid ingested, and remain fairly comfortable during the process. We found that, however grateful to the palate and gullet iced drinks might be as thirst-quenchers, they were inferior to *very hot weak* tea, sipped by teaspoonfuls, which had the additional merit of permanently removing the disagreeable bitter taste that was produced by the profuse loss of water through the skin.

Commenting on the physiological changes produced on the white man by residence in the tropics, Breinl and Young express their disappointment at the scrappy nature of past observations and their unscientific basis. But they do accept *neurasthenia*, varying from inability to concentrate attention on one's work up to uncontrollable outbreaks of temper, as a real and fairly frequent result of long residence in the tropics. They believe that it begins by increased output of energy consequent on the stimulation conveyed by the new and strange environment, that thus the energy capacity becomes overdrawn, and that by the time that the newcomer realises that he cannot do the same amount of work in the tropics as he did at Home, the mischief has been done. Combined with this, the monotony and discomfort of life and climate, the lack of pleasures and excitement, and the long distances from centres of civilisation, act to increase the condition. We recommend the perusal of this article to those who, for reasons best known to themselves, do not wish to believe in the existence of tropical neurasthenia, but prefer to view outbreaks of *Tropenkoller* as evidence of mere bad breeding.

They give a plan, devised by Mr C D Lynch, of a house for the tropics, which merits the serious attention of architects and officials of the Public Works Department in India. It is built of reinforced concrete or brick, and has *double outer walls*, between which is a three-inch air-space, suitably ventilated, which obviates the necessity of verandahs. The floor space has a cross-shaped central room on to which open other rooms. We give here the sketch—which makes one feel that those who are now thinking of building flats in Calcutta could not do better than imitate it.

### **An Appeal for Living Specimens of Fly Maggots from Cases of Cutaneous and Intestinal Myiasis in Man.**

MAJOR W. S. PATTON, I.M.S., Director, Pasteur Institute of Southern India, Coonoor, sends the following appeal for publication—

'It is well known that many flies, especially the familiar blue and green bottles and the large 'grey' striped, flesh-flies deposit either their eggs or living maggots in the human body

under certain conditions. This most often happens when there is an existing open sore, such as ulcers of all kinds, cuts and abrasions, etc., on any part of the body, offensive discharges from the nose, mouth and ears also attract these insects. The maggots burrow into the tissues and cause extensive damage, especially in such situations as the scalp. Others again gain access to the intestinal tract through food, and may lead to obscure intestinal disorders, in this case the maggots are passed out in the *fæces*.

It is of the utmost importance that we should have accurate information regarding the species which cause these painful conditions, and this can only be accomplished by collecting living specimens of the maggots. The writer appeals to all medical officers, who alone have the opportunity of seeing these cases, to send him specimens of the living maggots together with a short note of the case.

When maggots are discovered in sores, etc., it is usually the custom to apply such fluids as chloroform, turpentine, etc., in order to get them out of the tissues and at the same time to destroy them. Before doing this, would all medical officers who come across such cases please send some living specimens of the maggots to the writer? They should be carefully handled so that they may not be damaged and placed in a small tin with some moist earth, the lid of the tin being perforated with fine holes to admit air, the tin should be nearly filled with earth so that the contents may not be subjected to too much movement during transit. The tin should be securely packed and sent at once to the writer. All dead specimens should be pickled in 80 per cent alcohol, as these are of some help in identifying the genus to which the fly belongs. It should, however, be clearly understood that the species can only be identified by *hatching out the fly*, and this is only possible with *living material*. The writer will be glad to send any medical officer who is willing to collect specimens suitable tins and tubes containing 80 per cent alcohol, and will also give any further information which may be desired.

### **Notanda Passim.**

In a recent murder trial the Lord Chief Justice of England upheld the theory that it is the law and its exponents who alone are competent to decide the question of the sanity of an accused person. Of course, this is nonsense—the lawyers, whether at the Bar or on the Bench, are quite as unfit to deal with the subject of mental disorder as is the man in the street. By training and bent the legal mind rests on authority. The older the authority the better, instead of the more likely to be in error, as it is. The notorious pronouncement in the *Macnaghten* case has warped the minds of the gentlemen of the long robe, so that they cannot see that a "learned" judge in a case concerning mental soundness is just as much in need of skilled assistance as if he were trying a case of collision on the high seas. In the latter case he would be helped by technical experts. In the former he has to rely on his own ignorance, and, what is worse, on his ignorance that he is ignorant of the subject.



Here in India we have found much more intelligent appreciation of medical evidence in such cases than is met with at Home. What the reason for this may be we leave to our readers to guess.

In the April number of *Science Progress* the Editor, Sir Ronald Ross, has a good note on Awards for Medical Discovery. Exceptionally lucky as he has been, he pleads the cause of his less fortunate brethren and pleads it well. But in the same number he has written a railing article against the State for its neglect to act on his advice and compass the elimination of malaria from the earth. Obviously he hopes that this railing will not fall on deaf ears else he would not have taken the trouble to set forth his grievances. We do not feel sanguine as to the result for those who "govern" all nations are not concerned with the things that really matter. Politicians have no time for anything that is not likely to tickle the palate of the ignorant voter, and by so doing tend to keep them in Place and Power with their corollary Pelf. They are ill-instructed half-educated men who do not lead but are pushed this way or that by the capricious crowd. Some day—centuries hence—the average man will have received a real education and will insist on being governed by an oligarchy of the aristocracy of intellect. Then no suggestion made by a man of science will be "turned down" merely because it is not likely to catch and keep votes. Then selfishness will be a crime, being against the clear purpose of Nature to preserve the species at the expense of the individual numbers thereof.

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G. R. CLARKE,

*Director-General of Posts and Telegraphs*  
CALCUTTA, The 15th April, 1920

## Reviews.

CLINICAL METHODS.—By G. T. BIRDWOOD, M.A., M.D., D.P.H., *Lieut.-Col. I.M.S.* Third Edition. Calcutta 1920. Thacker, Spink and Co. Price Rs 7-8.

THE third edition of this handy *vade mecum* contains much more information than did even the second edition, which sold so well, because it was found to be of great use to workers in the mofussil. All that it contains is accurate, which is the best praise that can be given to a work of its kind. When he has this work with him, the practitioner will never be at a loss how to deal with many of the important matters which crop up each day in Indian practice.

PRACTICAL PHARMACOLOGY FOR THE USE OF STUDENTS OF MEDICINE.—By W. E. DIXON, M.A., M.D., F.R.C.S. Cambridge, 1920. University Press. Price 7s 6d net.

THIS little work is a guide to the performance of easy experiments which illustrate the

actions of drugs in common use. It does not, unfortunately, deal with decerebrate mammals, but is of use nevertheless for the student will learn much concerning the real, as distinguished from the supposed, action of drugs that he will not readily gather from more pretentious works.

THE SEXUAL DISABILITIES OF MAN.—By ARTHUR COOPER. Fourth Edition. London, 1920. H. K. Lewis and Co. Price 10s 6d net.

THE author of this book may be congratulated on having made a laudable attempt to reduce to a small compass a very large and complex subject. The first part of the book is devoted to a detailed account of the morbid conditions of the human semen and to the treatment of sterility. Part II deals with sexual impotence. The author starts by defining impotence as an "inability to perform the normal sexual act," a definition which lacks a good deal of precision and would certainly not include certain forms of psycho-sexual impotence. The definition would be improved were it made to read, "a complete or incomplete inability satisfactorily to carry out the act of *coitus per vaginam*."

The author then proceeds to divide impotence into primary and secondary. Under the latter heading he tabulates the causes of impotence which are characterised by "some definite preceding morbid condition, general or local," viz., induration of the penis, varicocele, diseases of the central nervous system, phthisis, malaria, X-rays, etc., etc. Primary impotence is defined as impotence for which no such cause can be found, i.e., no preceding morbid condition, general or local. It is, therefore, somewhat of a surprise to find among the causes of primary impotence references to certain morbid conditions of the mind. One is led to conclude that "a morbid condition" connotes to the author solely a morbidity of the tissues of the body, although he does cite "neurasthenia" as a cause of secondary impotence. The conclusions reached on p. 115 in relation to overwork as a cause of impotence are far from convincing, and they become all the less so by the citation of the case of Sir Isaac Newton in support of them. The author appears to have overlooked the fact that Newton, apart from his stupendous genius in a special field, was an incomplete and unsatisfactory human being, who ultimately reached a condition near akin to insanity. We think, indeed, that the subject of psychical impotence does not receive very clear or satisfactory treatment from the author. For no mention is made of the most important single cause, which may well be called the specific cause, of psycho-sexual impotence, namely, *unconscious incestuous fixation*, dating from early childhood, which results in many men being impotent with the woman they love, but able to develop high sexual capacity and pleasure with an inferior woman in whose society ethical and æsthetic scruples need not be



considered, and with one who is a complete stranger. In his remarks on the treatment of psychical importance the author discloses the light-hearted optimism of the surgeon, in a way that might well stagger the work-a-day psycho-therapist.

Under the heading of Prevention of Impotence, the author discusses shortly the problem of how best to explain sexual matters to children, especially to boys, and he refers to instances where the teaching of "Sex Hygiene" has not met with success, both in America and in Great Britain.

The subject is admittedly a very complex one, and it may lead in time to a reconsideration on the part of so-called civilised man as to whether or not he would do well to imitate the example of certain primitive races, whom he is now pleased to despise, by instituting ceremonies of initiation into manhood which involve not merely education in the ordinary sense, but a stern discipline of the character, feats of endurance, the trial of character—in short, the testing of the muscles of the soul as much as of the body. At present no such instruction has found a place in the curriculum of any school in Europe or America. The chapter devoted to Venereal Diseases contains views of the author that are both moderate and thoroughly sensible, so that one could wish that he had found it possible to prolong his discussion of this aspect of the sexual disabilities of man. Similarly on the subject of continence he has some quite sound observations to make, although he appears to make the very common mistake of failing to emphasise the biological fact that the act of healthy sexual union is the satisfaction of the erotic needs, not of one person, but of *two* persons. The postscript on "Sexuality and War" does not represent much else than a collection of somewhat *ex cathedra* utterances on the part of a few more or less well-known medical men, and the opinions expressed are frequently contradictory. The book is of a handy size and is furnished with satisfactory indices of authors and subject-matter.

**THE AFTER-TREATMENT OF SURGICAL PATIENTS**—By WILLARD BARTLETT, A.M., M.D., F.A.C.S., and Collaborators. Vols I and II, pp 1066, 222 original illustrations and 1 coloured plate in Vol I, and 213 original illustrations in Vol II. St Louis, 1920. C.V. Mosby Company. Price \$10.00.

THE two volumes of this book contain a considerable store of surgical information, based on the personal experience of the authors of work done in the Mayo Clinic, and on extracts from the works of many well-known authorities. The After-Treatment of Surgical Patients is dealt with in a much more ambitious way than in most books of this type. Take as an example the excellent chapter on Fat Embolism by O.F. McKittrick. Before the actual lines of treatment are discussed, the history of this complication is gone into, its pathology described, and the surgical operations which most

commonly produce it are mentioned. A bibliography completes most chapters.

Most of the surgical advances made during the war are alluded to, though we would have liked to have seen the subject of fractures more fully dealt with. The illustrations are numerous and excellent and many useful devices are shown.

We congratulate the authors on producing a work which will be of great value to senior students and to all surgeons. Every Civil Surgeon in India will find a copy valuable, particularly those associated with large hospitals.

Our only criticism is that the volumes savour too much of compilation and there is some lack of balance in dealing with the more important and less important sections. There are many minor points that some would criticise, but it is as well to remember that a book on surgery depicts a constantly shifting scene in which individual opinions and endless research must always play their part.

## Correspondence.

To the Editor of THE INDIAN MEDICAL GAZETTE

SIR,—In the February number of *The Indian Medical Gazette*, of the current year, there is an extract headed "An Amplification of Young's Rule," in which it is said that Young's Rule is inadequate in the case of infants, *vide* page 65.

My contention is that it is not so, and there can be no real difficulty if the prescriber takes a little trouble to make his mental calculations in fractions. What has been put forward as a modification or amplification by Cloud is in reality Young's Rule in disguise, only the mathematical calculation has been shown in a simplified form. Let us calculate from the example cited by Cloud, *c.g.*—

(1) At five months, the dose will be—

$$\begin{aligned} & \frac{5}{12} \text{ yr} \times 12 - \frac{5}{12} \\ &= \frac{5 + 144}{12} - \frac{5}{12} \\ &= \frac{149}{12} \times \frac{12}{5} = \frac{149}{5} = 30, i.e., \frac{1}{30} \text{ approx} \end{aligned}$$

(2) At 16 months, the dose is—

$$\begin{aligned} & \frac{16}{12} \times 12 - \frac{16}{12} = \frac{16}{12} \times \frac{144}{12} \times \frac{12}{16} \\ &= \frac{160}{16} = 10, i.e., \frac{1}{10} \end{aligned}$$

Therefore, where is the difference? So we can neither accept it as an amplification nor as a modification of Young's Rule. We can at best call Cloud's method a simplification of mathematical calculation, nothing more.

Yours, etc.,

R. K. BHATTACHARYYA, M.B.

NABADWIP, 1st May, 1920

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SUBJECT to His Majesty's approval the services of temporary Captain J Nasarwanji Hormasji Choksy are dispensed with on account of medical unfitness with effect from the 25th December, 1919

To be Honorary Surgeon to H E the Viceroy  
LIEUT COL P W SUTHERLAND, CIE, MD, IMS,  
vice Brevet Col R Heard, MD, IMS, appointed Surgeon to H L the Viceroy

To be Surgeon to H E the Viceroy  
BREVET COL R HEARD, IMS, vice Lieut-Col H A Smith CIE, MB IMS, appointed Inspector General of Civil Hospitals, Bihar and Orissa

In the notification in the *London Gazette* dated 1st December 1916 making certain promotions in the I M S for "24th July 1914" above the names of Edward Randolph Armstrong MB., and Charles James Stocker, MB read "29th July, 1914"

In exercise of the power conferred by section 10 of the Indian Universities Act 1904 (VIII of 1904) His Honour the Chancellor of the Allahabad University is pleased to nominate the following gentlemen to be ordinary fellows of the said University —

1 Lieut Col W Young, MB., CM IMS Civil Surgeon Lucknow

2 Major M R C MacWatters MB FRC.S IMS, Professor King George's Medical College Lucknow

CAPT L A P ANDERSON, IMS., Military Medical Officer Allahabad, to hold civil medical charge of the Allahabad district in addition to his military duties during the absence on privilege leave of Lieut-Col R G Turner, CMG DSO, IMS

CAPT E S PRIPSON DSO, MB IMS is confirmed in the appointment of Health Officer Simla with effect from the afternoon of the 13th October 1918

The following appointment is made with effect from the date specified —

Major H C Keates, IMS Civil Surgeon on general duty, Mayo Hospital, Lahore, with effect from 31st January, 1920 (forenoon)

THE undermentioned officers are permitted subject to His Majesty's approval to resign their commissions with effect from the dates specified —

Temporary Captain Gilbert Eugene Paul Dated 10th December 1919

Temporary Captain Bhumonjee Nowrojee Burjorjee Dated 14th February 1920

Temporary Captain Hirji Dorabji Gimi Dated 2nd March 1920

Temp Lieut to be temp Capt

R. C WATTS 26th Sept. 1919

MAJOR J MORRISON MB IMS of the Bacteriological Department is granted privilege leave for six months combined with furlough on average salary for two months with effect from the 15th April, 1920 or any subsequent date on which he may avail himself of the leave

MAJOR H B DRAKE IMS, officiating Assay Master, Calcutta, has been posted as officiating Assay Master Bombay with effect from the forenoon of the 15th March 1920 The duties of the Assay Master Bombay for the 13th and 14th March, 1920 were performed by Mr C R Robson BSc Deputy Assay Master, Bombay

THE services of the undermentioned officers of the Indian Medical Service are placed permanently at the

disposal of the Government of Madras, with effect from the dates noted against their names —

Major A J H Russell, MD 13th July, 1919

Major A S Leslie, MB 26th July 1919

Major F C Fraser 26th July, 1919

THE services of Majors Leslie and Fraser will remain temporarily at the disposal of His Excellency the Commander in Chief in India

THE KING has been graciously pleased to approve of the undermentioned rewards on the recommendation of the Government of India for distinguished service in connection with Military Operations in Persia (Bushire Force) Dated 3rd June, 1919 —

To be Brevet Major

Capt (A/Lt-Col) H R B Gibson, MB, IMS

THE names of the undermentioned have been brought to the notice of the Secretary of State for War for valuable services rendered with the Bushire Force in Persia during the period from 1st April, 1918, to 31st March, 1919 Dated 3rd June, 1919 —

Beatson, Captain B F, IMS, Bowle-Evans, Lt-Col (T/Col) C H, CMG MB, IMS, Cameron, Major A MB, IMS, Gibson, Capt. (A/Lt-Col) H R B IMS, Halliday Major (A/Lt-Col) H, MB, IMS, Jolly Maj (A/Lt-Col) G A, MB, IMS, Joshi T/Capt N, IMS, Khosla, T/Capt R N, IMS, Lapsley Major (A/Lt-Col) W, MB, IMS, Mitra T/Capt P N, IMS, Oonwala T/Capt J H, IMS, Rao T/Capt B S, IMS, Singh, (T/Capt) M A, MB IMS

MAJOR J S O'NEILL IMS, Military Medical Officer, to hold charge of the Civil Surgeoncy of Meerut, in addition to his own duties, vice Lieut-Col A W R Cochrane IMS transferred

LIEUT COL R G TURNER, CMG, DSO IMS Civil Surgeon Allahabad is granted privilege leave for three months with effect from the 15th April, 1920, or subsequent date

LIEUT COL E J O'MEARA, OBE., IMS, Civil Surgeon and Principal, Medical School Agra, is granted privilege leave combined with furlough on medical certificate for a total period of one year, with effect from the date he may take it

ON relief by 2nd Grade Assistant Surgeon Narbada Prasad Shrivastava, LM&S Lieut-Col A Buchanan MA MD MCh MAO IMS, Civil Surgeon Nagpur is appointed to be Civil Surgeon Pachmarhi, for the half of May and the month of June, 1920

LIEUT-COL W D HAYWARD MB IMS, Medical Store-keeper to Government Calcutta, is granted combined leave ex India for 8 months i.e., privilege leave for 1 month and 5 days and furlough for the remaining period, with effect from the 2nd January 1920 under the terms of Articles 233 and 241 Civil Service Regulations This office Notification No 1 dated the 17th February 1920 is hereby cancelled

THE KING has approved the retirement of the following officer and the grant of rank as shown below —

INDIAN MEDICAL SERVICE.

Capt. G L C Little, MB FRC.S.E., in consequence of ill health 5th February 1920

INDIAN MEDICAL SERVICE.

THE following acting promotion is notified subject to His Majesty's approval —

Major G G Hirst to be acting Lieut-Col while commanding No 3 Combined Field Ambulance East African Expeditionary Force from the 4th July, 1917, to the 29th July, 1917

SUBJECT to His Majesty's approval, the services of the undermentioned officers are dispensed with, with effect from the dates specified —

Temporary Captain Kumud Behari Chowdhuri Dated 14th March, 1920

Temporary Captain Mohim Lal Deb Dated 20th March, 1920

Temporary Lieutenant Therathawathu Cheriyan Matthew Dated 24th January, 1920

SUBJECT to His Majesty's approval, the services of temporary Lieutenant Vishwanath Hari Bedekar are dispensed with on account of medical unfitness, with effect from the 15th March, 1920

THE undermentioned officers are permitted, subject to His Majesty's approval, to resign their commissions, with effect from the dates specified —

Temporary Captain Dhanjishaw Phirozeshaw Karaki Dated 19th February, 1920

Temporary Captain Francis Barlow Ambler Dated 9th March, 1920

IN exercise of the powers conferred by section 10 of the Indian Universities Act, 1904 (VIII of 1904), His Honour the Chancellor of the Allahabad University is pleased to nominate the following gentleman to be an ordinary fellow of the said University —

The Hon Colonel J K Close, I.M.S., Inspector-General of Civil Hospitals, United Provinces

LIEUT-COL J M WOOLLEY, I.M.S., Inspector-General of Prisons, United Provinces, is granted privilege leave combined with furlough on full average salary for a total period of eight months, with effect from the 1st April, 1920, or subsequent date

IN exercise of the powers conferred by Regulation XI, Clause (a), of the Regulations for the nomination and election of members of the Legislative Council of the Chief Commissioner of the Central Provinces, the Chief Commissioner, with the previous sanction of the Governor-General, is pleased to nominate Colonel C R M Green, I.M.S., to be a member of the Council in place of the Hon Lieut-Col C H Bensley, I.M.S., resigned

LIEUT-COL. R H MADDOX, C.I.E., I.M.S., is appointed to be Civil Surgeon of Hazaribagh, with effect from the 1st March, 1920

IN modification of Government Notification No 1754, dated the 13th February, 1920, Lieut-Col W M Houston, I.M.S., Health Officer of the Port of Bombay, is granted privilege leave for six months combined with furlough on average salary for two months, with effect from the 3rd April, 1920, or the subsequent date of relief

LIEUT-COL. E F G TUCKER, M.B., B.S., M.R.C.P (Lond), I.M.S. is granted with effect from the 1st May, 1920, or the subsequent date of relief, privilege leave of absence for such period as may be due to him on that date in combination with furlough for such period as may bring the combined period of absence up to one year

IN exercise of the powers conferred by clause (b) of sub-section (1) of section 4 and section 10 of the United Provinces Medical Act (III of 1917), the Local Government is pleased to nominate Major J E Clements, M.B., D.P.H., I.M.S., to be a member of the United Provinces Medical Council, *vice* Lieut-Col J M Woolley, I.M.S., resigned

MAJOR C H BARBER, I.M.S., Professor of Medicine, King George's Medical College, Lucknow, to Aligarh as Civil Surgeon

LIEUT-COL. A W R COCHRAN, I.M.S., Civil Surgeon, from Meerut to Agra

LIEUT-COL. E F G TUCKER, M.B., B.S., M.R.C.P (Lond) I.M.S., is granted, with effect from the 1st May, 1920, or the subsequent date of relief, privilege leave of absence for such period as may be due to him on that date in combination with furlough for such period as may bring the combined period of absence up to one year

THE EXCELLENCY THE GOVERNOR IN COUNCIL is pleased to declare that the furlough for six weeks granted to Major A F Hamilton, M.B. (Lond), F.R.C.S., I.M.S., in Government Notification No 2609, dated the 9th March, 1920, should be considered as furlough on average salary

MAJOR K G GHARPUREY, I.M.S., is granted, with effect from the date of relief, privilege leave of absence for two months and fifteen days

MR D A TURKHUDD, M.B., C.M., Acting Assistant Director, Bombay Bacteriological Laboratory, is granted privilege leave for six months, with effect from the date on which he may avail himself of it

THE GOVERNOR IN COUNCIL is pleased to appoint Major S W Jones, O.B.E., I.M.S., to be Superintendent, Yeravda Central Prison

DR. J F LONO, L.M.S., D.P.H., D.T.M.S., Health Officer of the Nagpur Municipality, is appointed to be Second Deputy Sanitary Commissioner, Central Provinces, on a pay of Rs 500—25—600, for a period of five years, with effect from the date on which he assumes charge of his duties

CAPT C H FIELDING, I.M.S., to be acting Lieut-Col while commanding an Indian Casualty Clearing Station Dated 12th December, 1919

*Captain to be Major*

GEORGE FREDERICK GRAHAM, M.D. Dated 1st February, 1920

THE services of Major H R. Dutton, I.M.S., are placed permanently at the disposal of the Government of Bihar and Orissa, with effect from the 4th November, 1919

LIEUT-COL. F P CONNOR, D.S.O., F.R.C.S., I.M.S., Officiating Professor of Surgery, Medical College, Calcutta, and Surgeon to the College Hospitals, is appointed permanently to be Professor of Clinical and Operative Surgery, Medical College, Calcutta, and Surgeon to the College Hospitals, *vice* Lieut-Col. R P Wilson

## Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 Reprints gratis, if required

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs Thacker, Spink & Co., Calcutta

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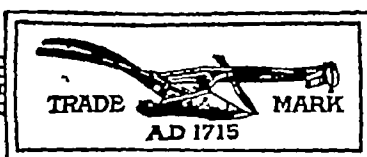
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Academy of Medicine Paris, 10th Nov 1903.

Academy of Sciences Paris 14th Dec, 1908

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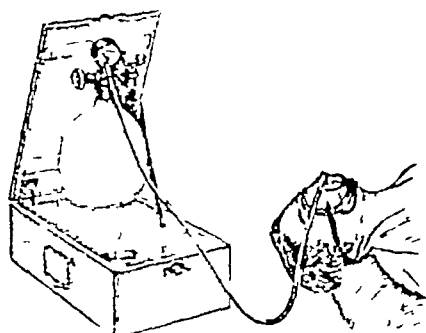
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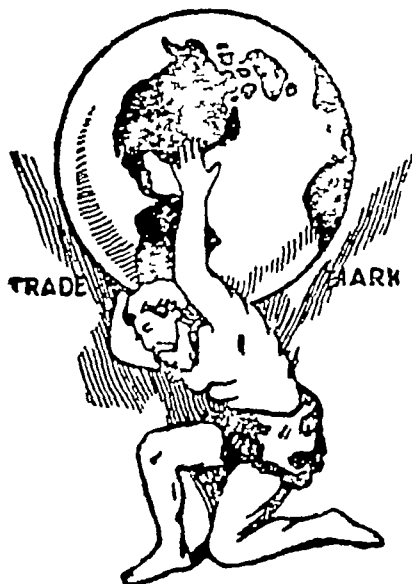
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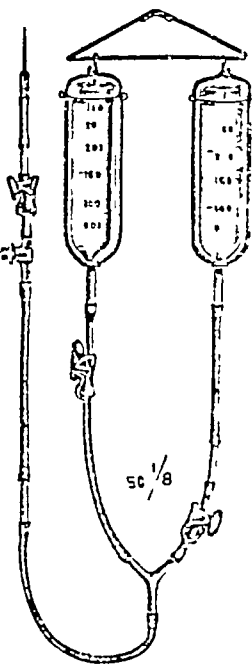
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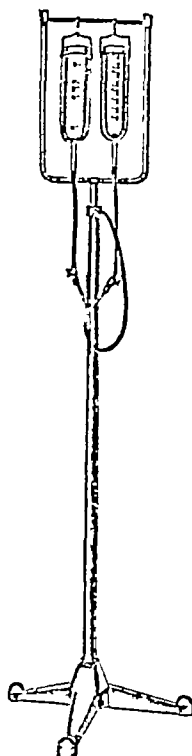
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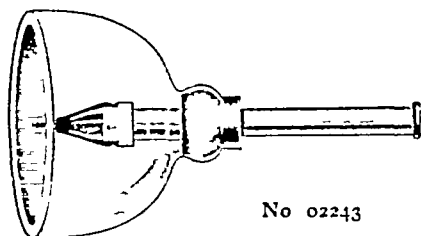


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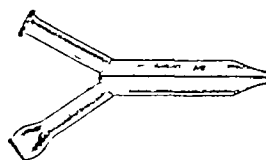
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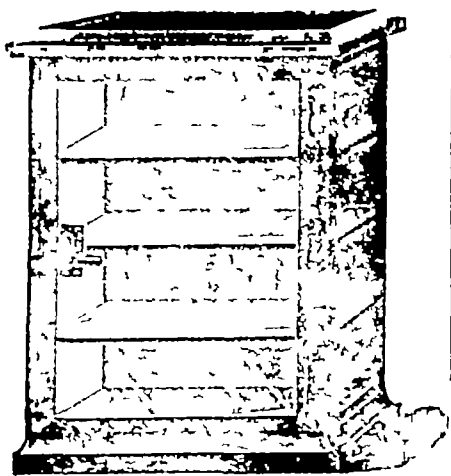


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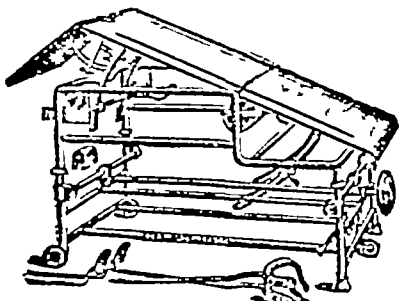
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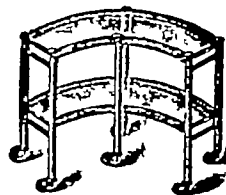
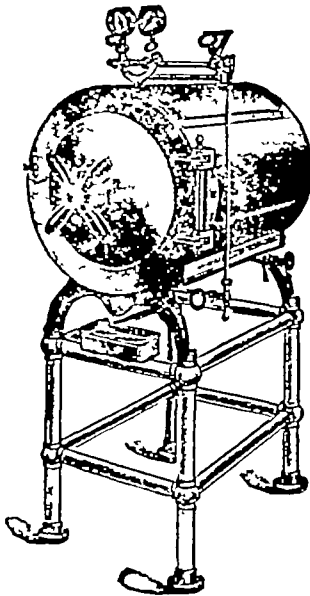


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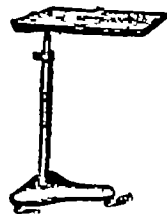


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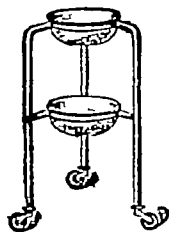


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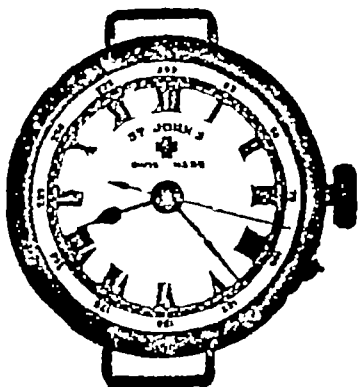
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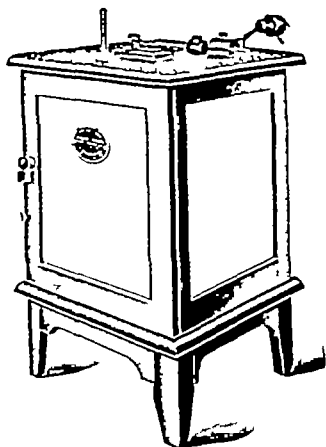
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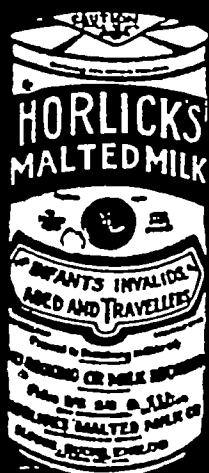
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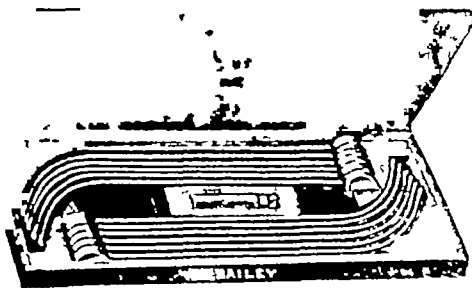
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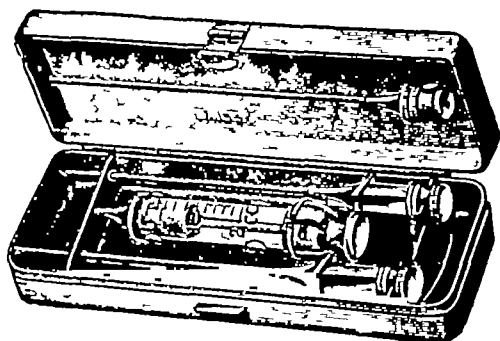
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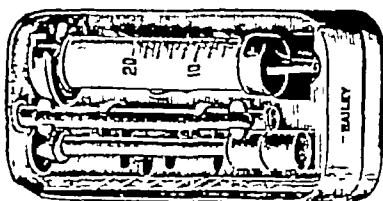
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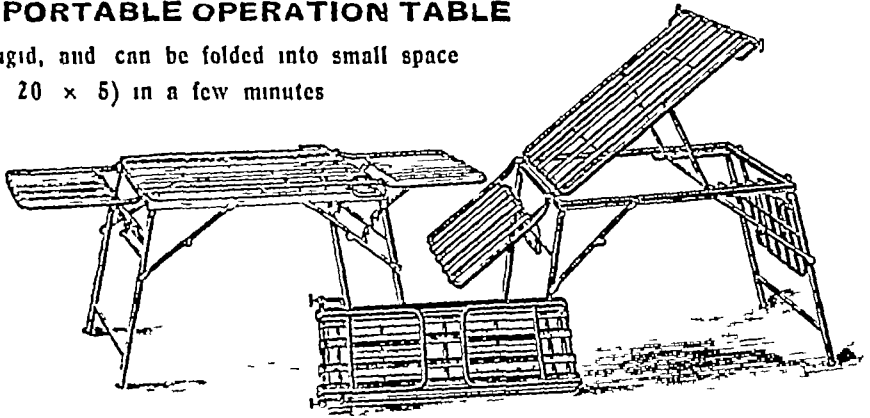
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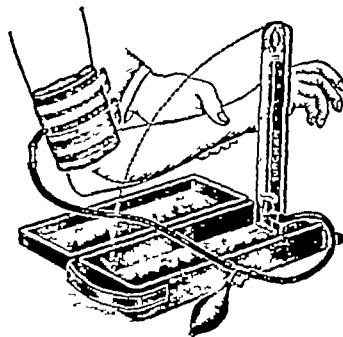
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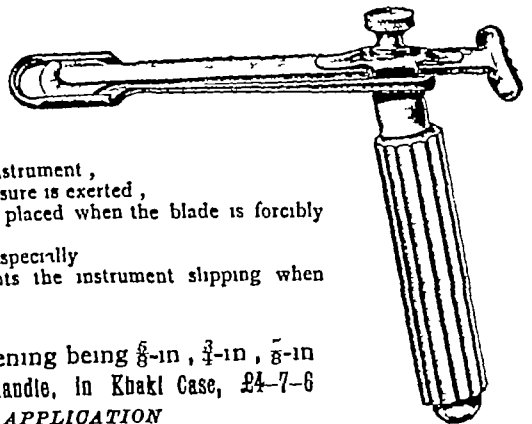
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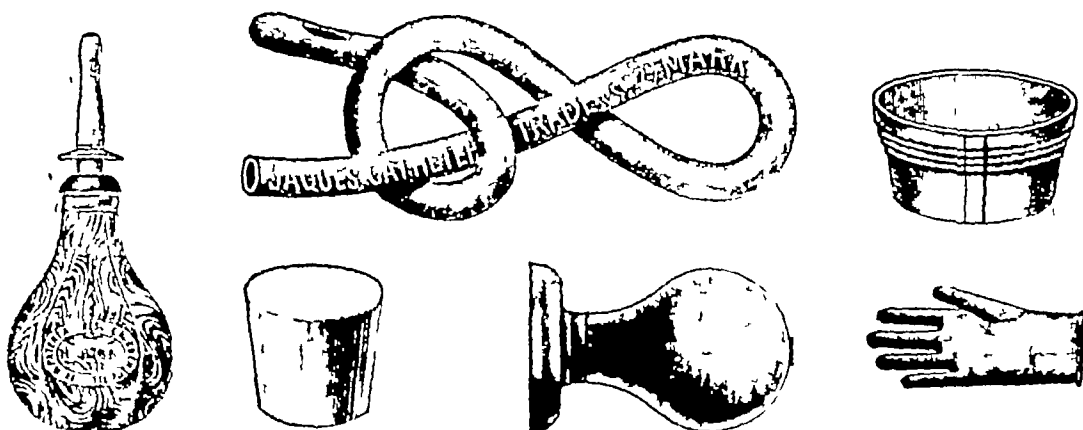
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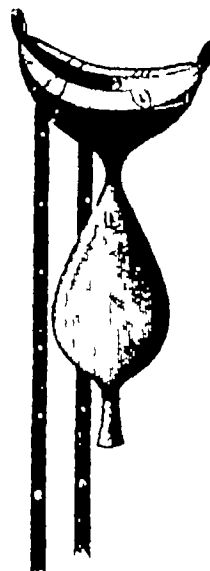
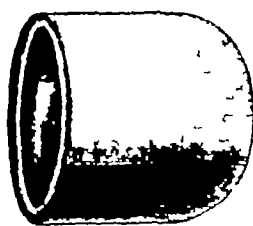


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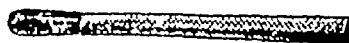
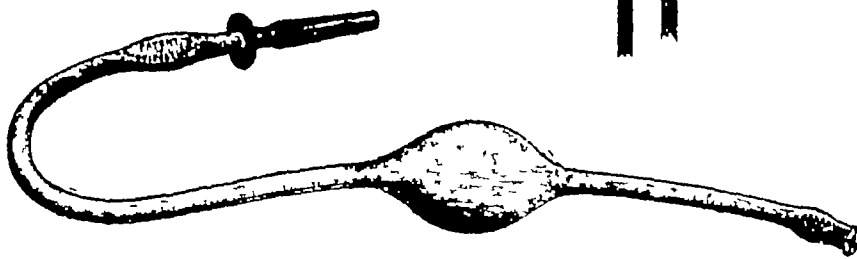
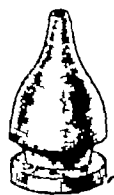
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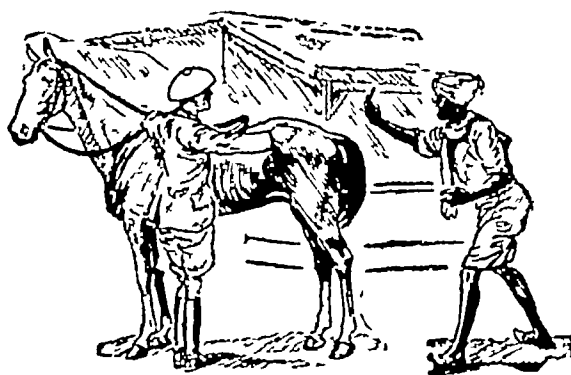
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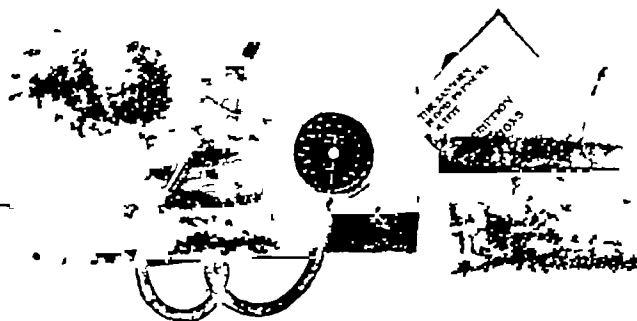
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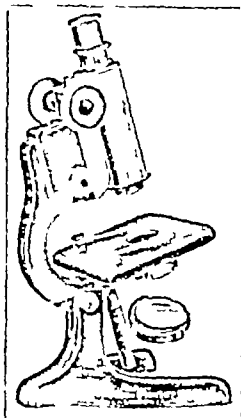
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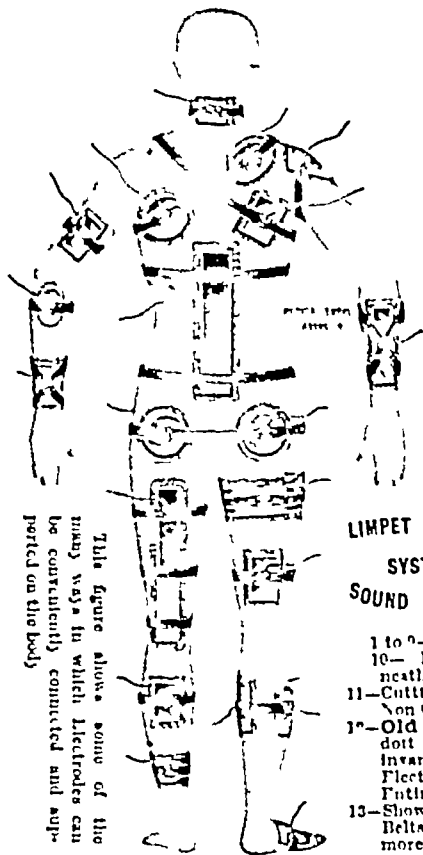
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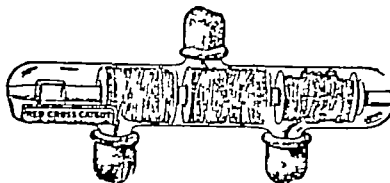
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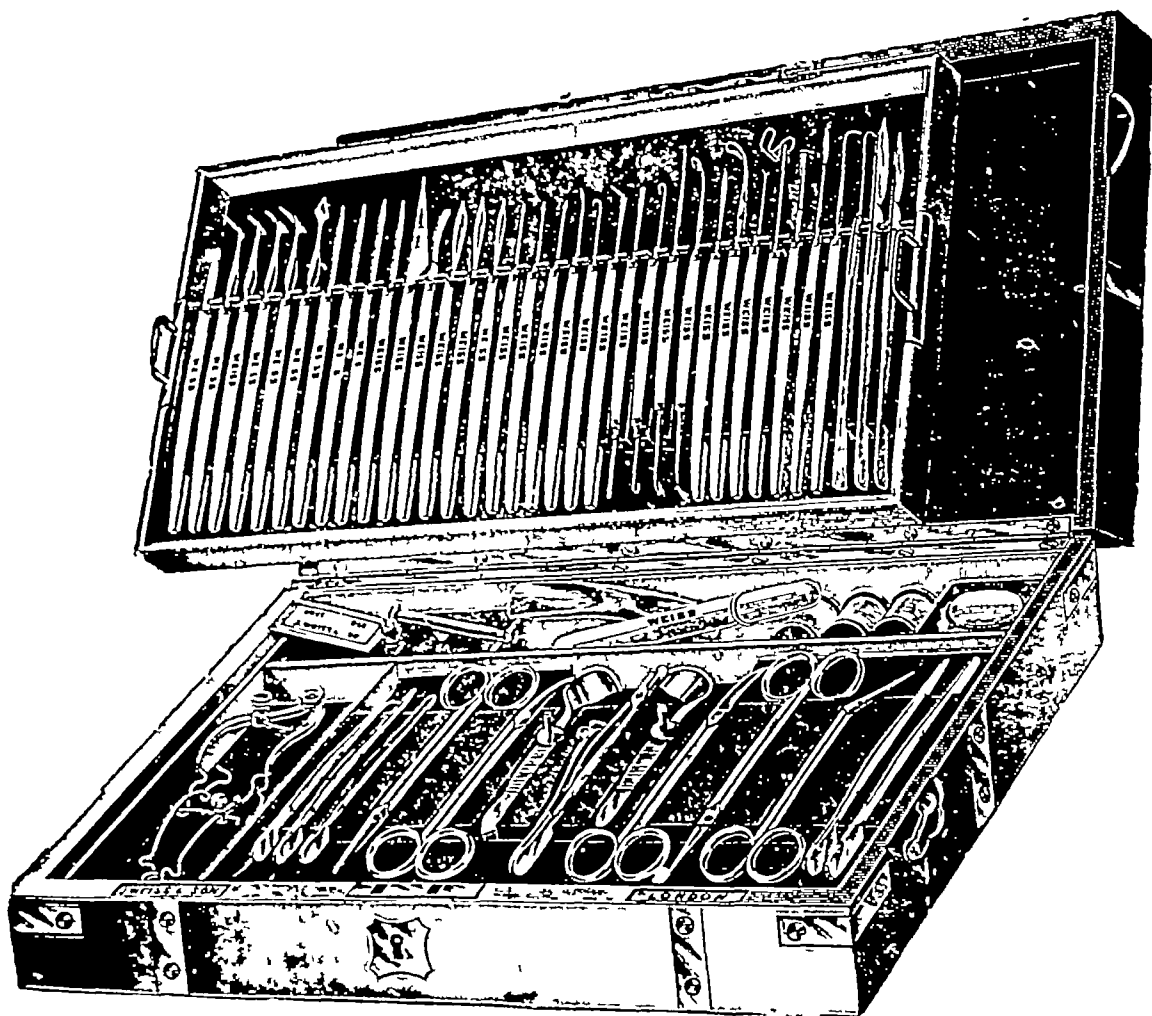
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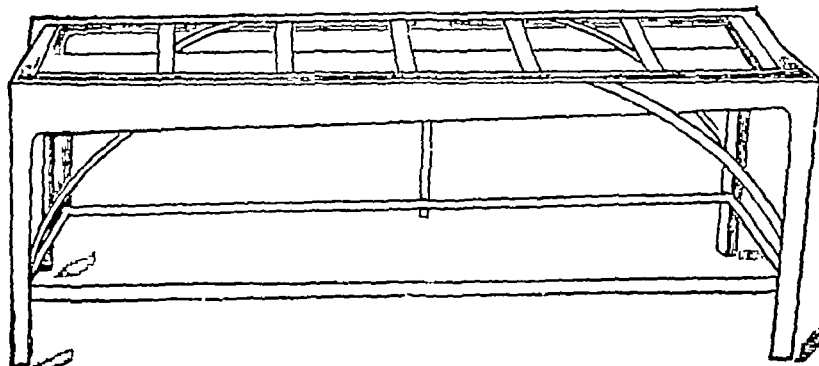
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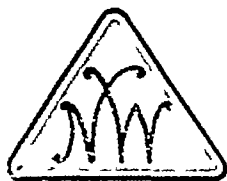
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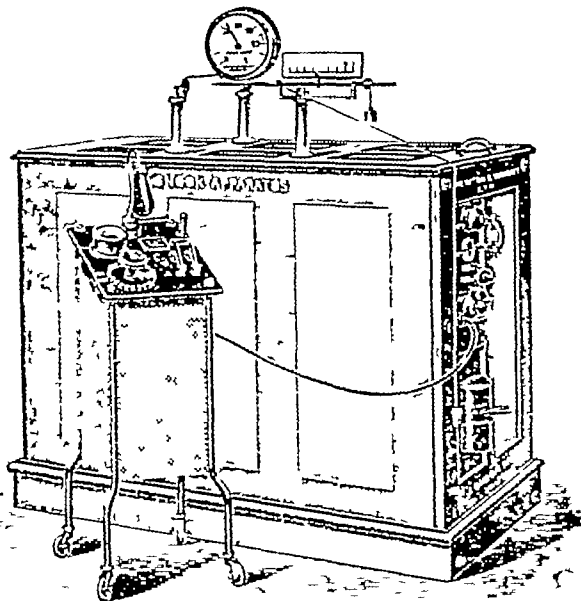
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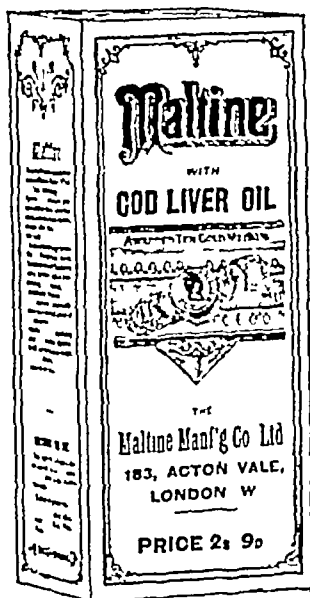
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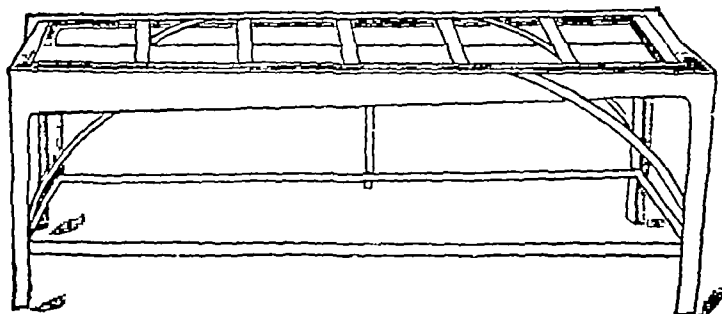
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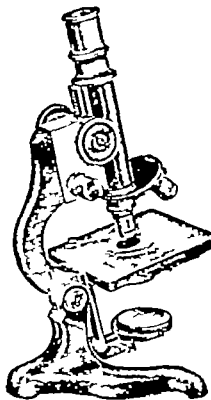
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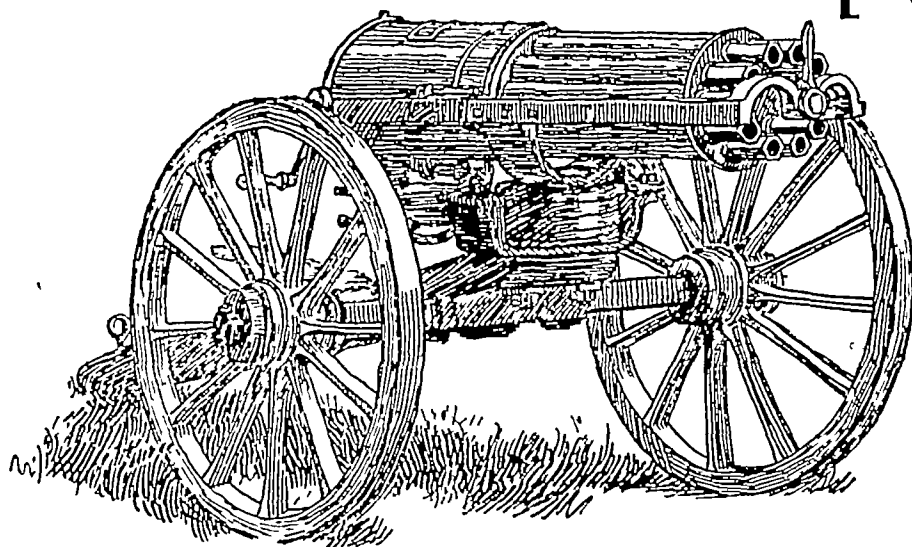


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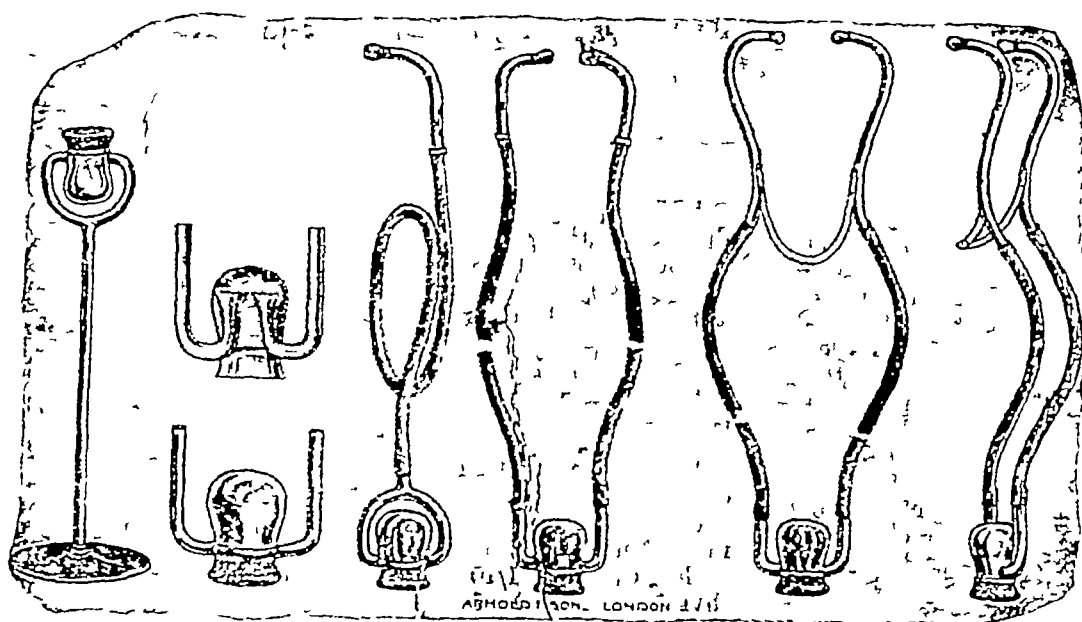
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FIG A

FIG B

FIG C

FIG D

FIG E

FIG F.

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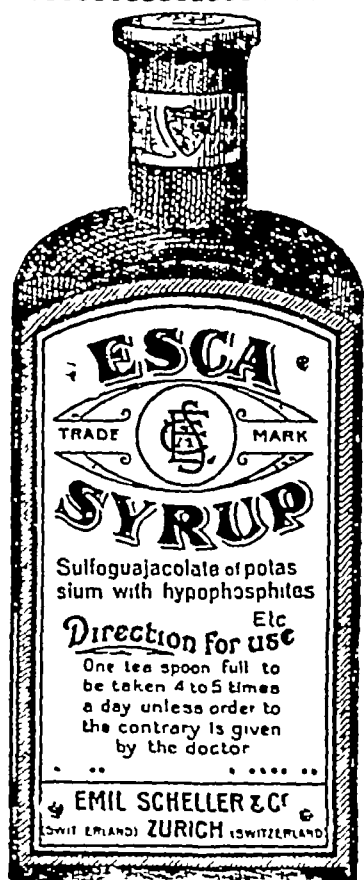
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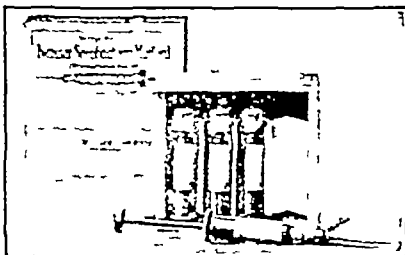
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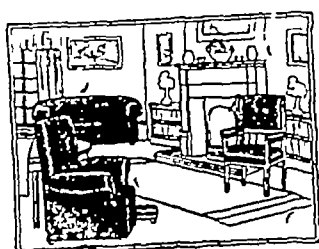


  
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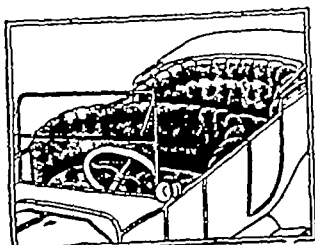
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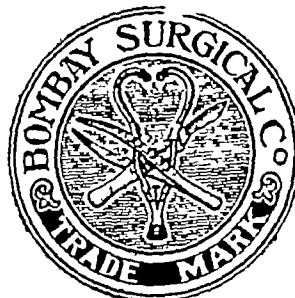
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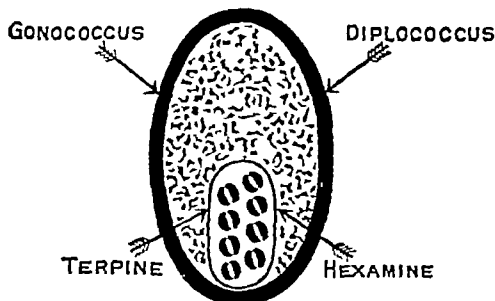
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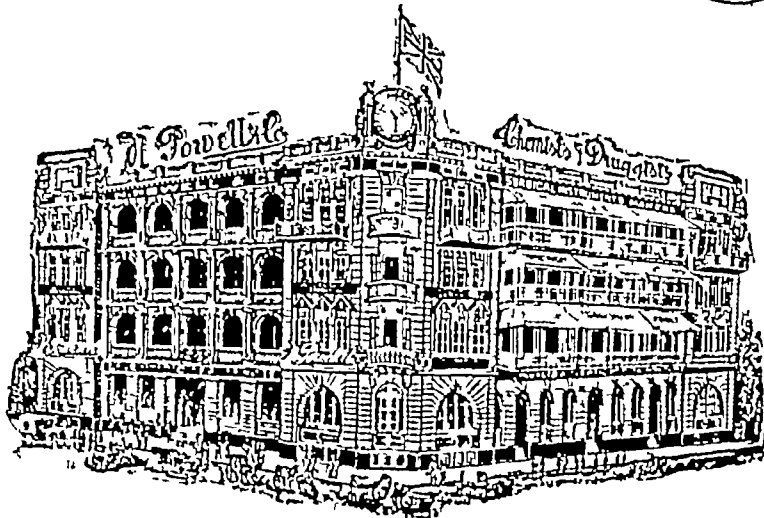
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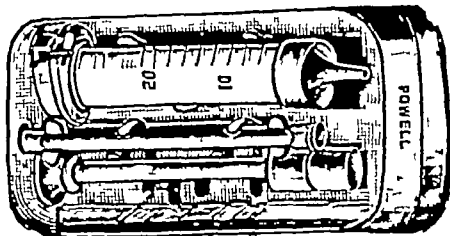
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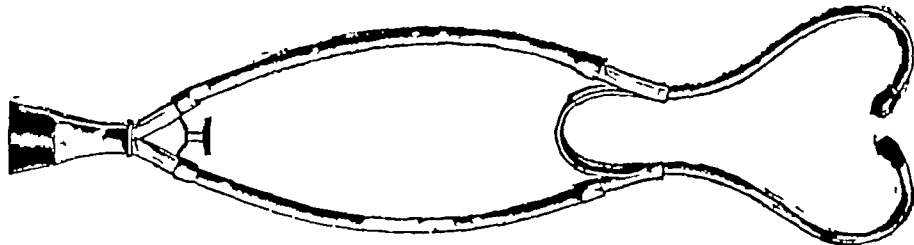
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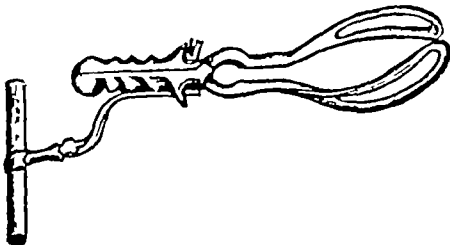
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Fig 402, Eye Instrument Case containing all instruments in metal handles and the case being velvet lined

Fig. 402, Eye Instrument Case No. 4

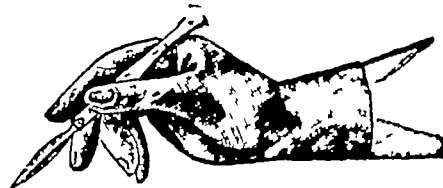
Fig 403, Eye Instruments in Morocco Case All Instruments in metal handles.

Fig 414, Set of Eye Instruments in Aseptic Metal handles and Metal case (N. P.) with movable racks

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"Since writing you last I have had a bad case of Chronic Suppuration of the Antrum of Highmore—many years standing—I operated upon it on March 24th, cavity was filled with foul smelling discharge and polyp which extended to the nose and of the worst kind. After cleansing out all the diseased tissue I had it dressed with gauze soaked in MILTON twice daily, a weak solution at first, the ordinary syringing being carried out first. These cases, as a rule, continue to discharge and stink for months after—not so this one—the smell diminished the first day and to day (10 days) there was no smell or discharge."

**AUXILIARY MILITARY HOSPITAL, FRODSHAM, CHE-  
SHIRE, 9th August, 1917—Messrs Milton Manufacturing  
Co., Ltd, John Milton House, 125, Bunhill Row, E C**

DEAR SIRS—Will you please forward 8 gallons of MILTON. We have had very good results from the use of this fluid—  
Yours faithfully, (Signed)

**EXTRACT FROM LETTER FROM A DENTAL SURGEON,  
Rodney Street, Liverpool, 23rd August, 1917**

"I wish I could give you as good a report of Milton as it deserves, for I find, as a germicide, and for cleaning up a "foul mouth," it is the best thing I have ever tried, for it acts almost instantaneously and does not irritate the mouth. I have also tried it for Pyorrhœa and other suppurating troubles of the mouth, and it has been splendid because of its strength without the irritation of nearly all other germicides which we use for Pyorrhœa. I constantly use it, and shall continue to do so."

From—Officer i/c Supplies  
To—Officer Commanding

T/11 August 25th, 1917

*Milton's Fluid*

Reference to the marginally noted disinfectant I have to inform you that while Mr Smith, the manufacturers' representative, was here, he not only demonstrated this preparation to me, but I also made a test of the same for our own satisfaction.

This test consisted of spraying a piece of beef with the solution and leaving the same outside in the sun, the idea being to see the result from flies.

The meat remained in the open air seventy hours before it became fly blown and it is doubtful in my mind if there would have been fly blows at that time, had it not rained the previous night. The rain, no doubt, washed off the solution, but even at that, though the fly blows were in a tissue pocket, and the meat had become dark in colour, externally only, due to having been seared from the sun's heat, when cut open was very fresh in both colour and smell, and was quite edible.

If the present intention to issue freshly killed beef is to be put in operation, this solution will be invaluable to me. I have had no occasion to use the solution on frozen meat only having used the preparation as a straight disinfectant in the butchery where I find it certainly purifies the air, and takes away any odour there may be.

I find it very good for removing the odour arising when mutton has been hanging any length of time.

To—Major , London

*Personal*

Remarks by the Supply Officer above in connection with the test made of Milton at the Supply Depot of this Station are forwarded please. I might mention what I saw of one or two demonstrations made by Mr Smith, it could be used to a very great advantage for many purposes, both in the Supplies and the Transport Sections of the C. A. S. C. It is by far the best disinfectant I have as yet seen and in view of the fact that fresh meat issues are about to be made, the butchers' shop is going to be not very far short of a slaughter house, and as a disinfectant and fly exterminator for this particular purpose I would strongly recommend the purchase of Milton in this connection.

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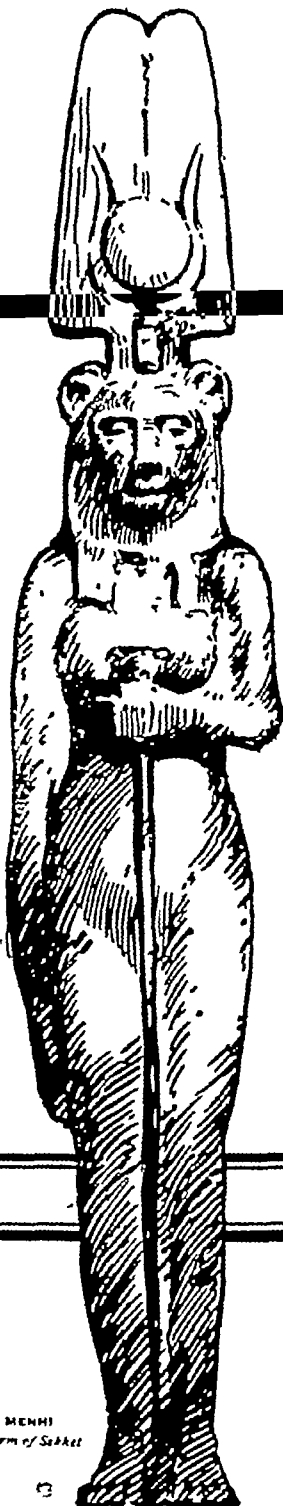
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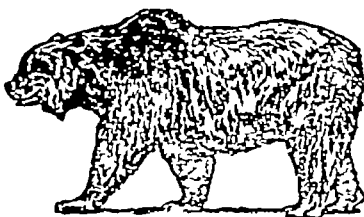


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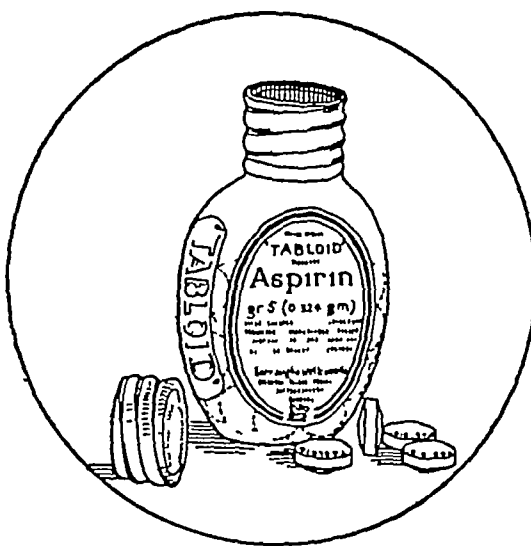
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## Original Articles.

### STANDARD DIETS

By J A SHORTEN,

MAJOR, I M S

(A lecture delivered at the Calcutta Health and Child Welfare Exhibition)

THE subject on which I have been requested to address you this evening is one the importance of which can scarcely be over-estimated. The question of the most suitable diet for human beings has engrossed scientists, and I might add cranks and quacks, throughout the ages. It will be obvious to all of you who live in India, or have travelled abroad, that human beings can live and flourish on many different types of diet and foodstuffs. The diet of the Hindu is not that of the Mohamedan, and the diet of the European is different from both. Yet all three flourish side by side in India. It is obvious, however, that there must be some common basis, for physiologically there is very little difference between individuals of different races. It is to this basis that I wish to direct your attention this evening.

The subject of a standard balanced diet has formed the ground for much controversy. Books and pamphlets on dietetics have been written and are being written *ad nauseam*. Those who believe in our ultimate descent from monkeys point to our dentition and say man was meant to be a vegetarian. Others, noting the superior development and predominance of the meat-eating races, hold that the development of the human race began when man became a hunter and, so to speak, tasted blood. Each view may be right in its own way, but the fact remains that man is an omnivorous animal and flourishes best as such. In seeking for a properly balanced diet we must start from this assumption. I do not propose, however, to discuss the various theories of cranks and faddists, but to confine myself to well-established facts,—facts which are capable of experimental proof.

Until a few years ago physiologists and physicians were satisfied that bed-rock had been reached in the matter of diets. Quite recently, however, new facts have come to light. The Great World War which brought misery to thousands has been the means of shedding light on many medical and hygienic problems. The question of an adequate and well-balanced diet is not the least of these. Among other things that the war taught us is the fact that most of us who are fairly well to do can live on much less than we usually eat, in fact, we should feel better and be better with less food. In England during the war many essential foodstuffs such as butter, meat, milk, and sugar were of necessity reduced to a minimum, and people generally did not seem to suffer in consequence.

The minimum, however, is not necessarily the optimum. We must remember that we are not delicately balanced mechanisms but living beings,—our powers of adjustment are almost unlimited. A speck of dust will stop the delicate movements of a watch, but it would take many specks of dust to stop beating of the human heart. The recent dismal mechanistic physiology, to quote Bayliss, is passing away and is being to some extent replaced by the ancient ideas of vital force.

To return to the elucidation of the problem before us let us ask ourselves what is the purpose of food. In this connection Professor Bayliss, the eminent physiologist, writes —

"The purpose of food is two-fold—on the one hand, to serve as material out of which the structures of the body are produced, and, on the other hand, to afford the energy required for muscular work by being burnt up and oxidised." Food, as it were, on the one hand, goes into the walls of the human edifice, and on the other hand into the fire on the human hearth. Food is used for constructive purposes chiefly in the young and growing animal. The amount required to replace ordinary wear and tear of the active tissues is very minute. So that the greater part of the food of adults is used to supply the human engine with fuel.

Theoretically any combustible substance that can be digested and absorbed may serve as a source of energy, but practically our choice is very limited. Petroleum, for instance, when burnt in an internal combustion engine is capable of yielding an enormous amount of energy, but it is perfectly useless as food.

There are three classes of chemical compounds available as foodstuffs, *viz.*, proteins, fats, and carbohydrates. Examples of proteins are egg white, meat, etc., of fats, butter and suet, and of carbohydrates, sugar, starch, flour, etc. It is found that certain minimum quantities of each of these foodstuffs are necessary to maintain the body in an equilibrium of material and energy. But these are not sufficient for the maintenance of perfect health. We require in addition water and certain mineral salts, such as chlorides and phosphates of sodium and potassium.

These five substances, proteins, fats, carbohydrates, water, and salts, are usually referred to as the proximate principles of food. Until recently these five proximate principles were, with the oxygen we take in through our lungs, considered all-sufficient for the maintenance of life and perfect health. It is now recognised, however, that certain other substances, called accessory food factors, are necessary. The absence of these for any length of time will lead to one of the so-called deficiency diseases. Of these accessory food factors one is called *fat soluble "A,"*—a substance which is found in animal fats such as butter and suet, and also in certain of the leafy vegetables and grasses, but not in vegetable oils or fats such as go to make margarine. This substance is necessary



for the growth and development of young animals. Young rats, for instance, fail to grow and eventually die if fed on a diet from which this substance is eliminated. The importance of this discovery in considering the diet of infants and young children is self-evident. The second accessory food factor is called *water soluble "B"* since it is soluble in water. This substance is widely distributed in the vegetable kingdom, being found in abundance in the wheat-germ and yeast. It is also present in certain animal substances, such as yolk of egg. It appears to be necessary to prevent the development of beri-beri. Fat soluble "A" has recently been shown by Mellanby to be identical with a substance which prevents rickets. In addition to these two groups of substances there is a third which prevents scurvy. According to our present knowledge, then, the substances which go to make up an adequate diet are —

- 1 Proteins
- 2 Fats
- 3 Carbohydrates
- 4 Water
- 5 Salts
- 6 Accessory food factors, of which we know three — Fat soluble "A," water soluble "B," and the antiscorbutic factor

The characters of a suitable and healthy diet may be summed up as follows —

(1) It must contain the proper amount and proportions of the various proximate principles

(2) It must be adapted to the age and weight of the individual, the amount of work he performs, and the climate

(3) The proximate principles must be present in a digestible form. For instance, peas and beans contain a large percentage of protein, but, in an indigestible form, and, therefore, are not as good a source of protein as meat

In order to arrive at a standard diet physiologists in the past have been at pains to strike a balance between the amount of nutriment ingested and the amount excreted in various ways. The two most important chemical substances concerned are carbon and nitrogen. It has been found that a healthy man eliminates 250–280 grms of carbon and 15–18 grms of nitrogen daily. These must be replaced by carbon and nitrogen in the food. Now, chemistry tells us that the main source of carbon is the carbohydrates, and that of nitrogen the proteins. Hence the great importance of these two food-stuffs or proximate principles

The value of diets is usually expressed in terms of their heat-value, that is, the amount of energy they can liberate as heat on complete oxidation. The unit of heat-value is the caloric, or the amount of heat required to raise the temperature of one kilogram of water by one degree centigrade

It will be clear to all of you that the necessary amount of food will vary in proportion to the amount of work done. But even when we

are asleep energy is being used by the heart and other vital organs, and also to keep up the body temperature. This "basal metabolism," as it is called, has been calculated at 1,700 calories per day, for a man of 11 stones. If we then add on to this the amount required for various types of work we arrive at a basis for a standard diet. For instance, a tailor, doing light work, would require about 2,500 calories per diem, a metal worker 3,800, and a wood sawyer 5,500

To give a concrete meaning to these figures Professor Bayliss gives the amounts of various foodstuffs required to furnish 100 calories roughly as follows —

Butter	$\frac{1}{2}$ oz	(13.5 gms)
Cheddar cheese	$\frac{3}{4}$ oz	(22 gms)
Sugar	$\frac{3}{4}$ oz	(24.5 gms)
Oatmeal	1 oz	(28 gms)
Mutton	1 oz	(29 gms)
Fish	$2\frac{1}{2}$ oz	(67 gms)
Eggs	$2\frac{1}{2}$ oz	(68 gms)
Milk	5 oz	(145 gms)

From figures such as these we can readily calculate the amount of different foodstuffs we require. We must, of course, always allow for food which may not be digested and utilised. An addition of 10 per cent is usually considered to be sufficient to cover this loss.

Working on the above lines various physiologists have arrived at certain standard diets, one of the best known of these classical diets is that of Ranke. It consists of —

Protein	100 gms
Fat	100 gms
Carbohydrates	250 gms

This diet has a heat-value of about 2,500 calories. Voit and others give more liberal diets.

The diet recommended by a Committee of the Royal Society, appointed during the late war to work out a diet for the nation, was as follows —

Protein	70 gms	280 calories
Fat	90 gms	810 calories
Carbohydrate	550 gms	2,200 calories
Total		3,290 calories

This diet is considered suitable for a man of 11 stones doing moderate work. It will be noted that it is somewhat poorer in protein and richer in carbohydrate than the classical diet mentioned above. Tables have been drawn up from which the total calorie value of a given diet can be calculated. Moreover, as Professor Bayliss points out, most of the complex articles of diet such as bread, potatoes, etc., contain a sufficient proportion of protein,—a fact which he has expressed in the aphorism, *Take care of the calories and the protein will take care of itself*.

We may now turn for a few moments to the different proximate principles and consider their use individually and their history in the metabolism of the body

*Proteins*—As already pointed out, we require nitrogen to replace that eliminated in the excretions, and to build up the structural machinery of the body. This nitrogen we take in the form of protein. Now, protein is absorbed with difficulty from the intestinal canal. Hence the necessity for digestion. Protein is broken up into simpler substances by the digestive juices and is finally absorbed in the form of amino-acids. Part of the absorbed amino-acids are converted by the liver into urea, which is eventually excreted, and the rest pass on to be built into the tissues. Only a small moiety of the protein absorbed goes to supply energy. The amount of protein required is relatively small, as it depends on the amount of tissue waste to be repaired, and is not important as an energy-yielding food. The Royal Society Commission recommended a ration of 70 gms daily—part of which should come from animal sources. The majority of the classical standard diets include 100 gms or over.

High protein diets are condemned by various writers. Chittenden, for instance, as a result of experiments on students, soldiers and athletes, came to the conclusion that 30 to 50 gms of protein daily, according to the weight of the individual, is all that is needed. The period of observation, however, lasted only a few months, and it is clear now that he was deceived by some of the subjects of his experiments.

McCay calculated that the average Bengali metabolises only 37.5 gms of protein,—a figure which closely approximates those of Chittenden,—and maintains health thereon. But on the other hand he draws attention to the marked physical inferiority of the Bengali when compared with meat-eating races living under similar conditions, and the great prevalence of renal diseases amongst them.

Our instinctive appetites lead us when possible to adopt a diet with a high protein content, and it would seem to be only reasonable to encourage a certain margin of safety. The Roast Beef of Old England is a phrase which may have more in it than meets the eye, as the Boche found to his cost.

Before leaving the subject of proteins a reference must be made to the so-called purin-free diets, the advocates of which claim so much. The best known of the purin bodies is uric acid, a substance which is probably the most maligned of all chemical compounds. Half the ills to which human flesh is heir are attributed to it. Purin bodies form components of the nuclei of the cells of the body, and are normally excreted in small amounts. Excess of uric acid is undoubtedly associated with gout, but there is no proof apart from this that the group possesses any particular toxic properties. It is interesting to note that caffeine, the chief alkaloid of coffee and tea, and theobromine, the active principle of cocoa, are closely related to the purin bodies. You will

be pleased to know, however, that the balance of scientific opinion is against advocates of this fantastic diet, and you may continue to enjoy your tea, coffee and cocoa without fear of the dire evils which they say will befall you.

*Carbohydrates*—These can be dismissed in a few words. They form the chief source of our supply of energy. Since they contain no nitrogen they have little to do with tissue growth or repair. The chief carbohydrates taken as food are starch, cane-sugar, milk-sugar, maltose and glucose (in fruit, etc.). They must all be converted into glucose, or some simple sugar of the same group, before absorption. This change is chiefly brought about by the saliva. Hence the importance of properly chewing starchy foods. After absorption they are partly stored in the liver as glycogen, and the rest is passed on to the tissues, especially the muscles, where it forms the main source of the energy required for muscular contraction. Carbohydrates, therefore, are of great importance to those who undergo prolonged or severe muscular exercise, such as is involved in mountain climbing and marching. On the other hand, excess of carbohydrates, such as sweetmeats, is liable, in the indolent, to lead to failure of the mechanism for digesting and utilising them, and eventually to diabetes, as has been shown by McCay and his collaborators.

*Fats*—As already mentioned, both proteins and carbohydrates are absolutely necessary constituents of our food on account of the necessity of replacing the nitrogen and carbon lost in the excreta. The same cannot be said of fats, except in so far as they serve as a vehicle for the fat soluble vitamins. Fat is formed from carbohydrate in the body. In fact, the excess of carbohydrate ingested is up to a certain limit laid down in the body as fat. The digestive juices split fat into fatty acids and glycerine, which are recombined as they pass into the lymphatics, so that the absorbed fat eventually appears in the blood in the form of fine droplets.

Fat is a very concentrated form of energy-giving food, yielding 9 calories per gram as compared with 4 calories per gram each in the case of proteins and carbohydrates. The Royal Society recommended that 28 per cent of the total calories of a diet should be in the form of fat.

*Salts*—No special provision need be made for salts. They are present in many of the usual articles of diet, such as fruits, vegetables, and salads.

*Water*—The necessary supply of water is regulated by the feeling of thirst. Neither water nor salts afford energy, but, as Bayliss expresses it, they are necessary in the same sense as lubricating oil is to a motor.

*Accessory food-factors*—The fat soluble "A" factor is necessary to ensure growth—particularly in children and in adults recovering from wasting diseases. It is, therefore, important

that growing children should have a plentiful supply of fresh milk, butter and eggs. In the absence of these, codliver oil may be given as a substitute or as a medicine.

As regards the water soluble "B" factor, this, as already mentioned, is widely distributed in the common articles of diet. Danger arises, however, from a one-sided diet, as when polished rice or white bread forms the staple diet. This vitamine is concentrated in the outer layers of the grain, and this is the part removed by the process of milling. The seed-germ, too, which contains a large proportion of the vitamine, is removed by the same process. The importance of unpolished rice and whole meal bread to a community living mainly on these foodstuffs cannot, therefore, be over-estimated.

*The anti-scorbutic factor*—This is a recent discovery, although scurvy is one of the oldest of the recognised human diseases. It has long been recognised that fresh fruit and vegetables are necessary to prevent the appearance of this disease among bodies of men such as sailors and troops. The classical Treatise on Scurvy, by James Lind, published 150 years ago, gives an excellent account of this disease and the use of fresh vegetables and fruit in its prevention.

The recent researches of Harriet Chick and Margaret Hume have added greatly to our knowledge of anti-scorbutic vitamins. Working with guinea-pigs, which readily develop scurvy on a basal diet of grain and water, these authors investigated the preventive effects of the addition to the basal diet of (1) fresh and dried vegetables, (2) fresh fruit juices, pulses soaked and germinated, (3) milk, (4) meat.

Their results and those of various American investigators go to show —

(1) The protective power of small quantities of fresh vegetables.

(2) Vegetables dried at high temperatures have no anti-scorbutic properties, but if dried at low temperatures they retain an appreciable amount of this virtue.

In this connexion, in conjunction with Dr Charubrata Ray, I have recently been able to demonstrate that certain of the sun-dried vegetables from Quetta, which correspond to the "low-dried" factory product, also retain considerable anti-scorbutic powers, those specially active being sun-dried tomatoes, potatoes and cabbage.

(3) Fresh lime juice protects, but stale or artificial products are useless.

(4) Fresh milk has considerable power, but if subjected to prolonged boiling or heated to 120 degrees C, it loses its power of protection.

(5) Fresh meat has some preventive properties, but they are not so marked as in vegetables, etc.

Among other facts demonstrated by various research workers is the fact that ordinary boiling of vegetables does not diminish to any great extent their anti-scorbutic properties, but if

the boiling is prolonged, or if alkalies such as bicarbonate of soda are added to the water, the vitamine is quickly destroyed. Prolonged cooking such as that involved in the hay-box method of cooking, in vogue during the war, is thus unsuitable for any substances of anti-scorbutic value (fruit and vegetables).

It also follows that tinned rations, vegetable or otherwise, which have been raised to 120 degrees C in the process of manufacture, are devoid of anti-scorbutic properties.

One of the most important discoveries made by Chick and Hume is that although dried pulses have no anti-scorbutic properties, if moistened and allowed to germinate, the anti-scorbutic elements re-appear in 48 hours, and that such freshly germinated material may be cooked for from 1 to 1½ hours without destroying the anti-scorbutic vitamins.

In conclusion you will naturally ask—How can the layman apply all these principles in daily practice? A few simple diet rules will best answer this question. These are —

1. Avoid a one-sided diet, remembering that you require proteins, fats, carbohydrates, and accessory food factors.

2. As good digestion is said to follow appetite, have your food cooked to satisfy your tastes and desires.

3. In the case of children, remember the importance of fat soluble "A" and give fresh milk, butter and eggs. Fresh orange or lime juice should also be given daily to prevent the possible development of scurvy.

The question of fresh milk is a difficult one on account of the danger of infection by enteric germs, cholera, etc. But if you can't keep your own cows it will be possible for many to keep goats which can be milked under your personal supervision. If you can't do either, remember the value of codliver oil.

4. Remember the value of whole meal flour and unpolished rice when flour and rice form the main articles of your dietary.

5. Remember the anti-scorbutic value of fresh vegetables and fruits. As regards the danger of cholera or typhoid, fruits the skin of which can be removed, such as oranges and plantains, are always safe. Fresh vegetables such as salads can be made safe by simply scalding in boiling water or using some simple disinfectant such as Condy's fluid.

6. Lastly, do not boil your vegetables for too long a time and, above all, do not add soda to soften them.

These few simple rules sum up all the most recent knowledge on the subject of diets.

## TYPHUS AND TYPHUS-LIKE FEVERS IN BIRJAND, EAST PERSIA

By A S FRY,

CAPTAIN, I M S

TYPHUS FEVER has been met with frequently by the Medical Services in the northern part

of East Persia, both amongst the inhabitants and amongst our own troops. The Russians in Transcaspia have suffered heavily from the epidemic disease.

The following notes were gathered from nine cases of typhus or typhus-like fever which were met with in Birjand during 18 months of hospital experience amongst the garrison of troops stationed there. Six of these cases were admitted to hospital during May and the last few days of April, 1919. One case occurred in the middle of June, and the other two during the first three days of July, 1919.

*Case 1*—The first admission was a young Indian clerk of the Works Department, on April 24th, complaining of fever since the previous day, severe headache and backache. There were no physical signs to note other than a furred tongue. The blood was negative for malarial parasites and for spirilla. The following evening the blood was again examined without result. On the fourth day of the disease the tongue was very red and fissured. The throat was congested and the uvula oedematous. There were no head symptoms or signs. On the fifth day the patient declared that he felt better, and the pain in the head and back was less. A few red spots, which faded on pressure, were observed over both arms and on the trunk. The patient was promptly isolated under suspicion of suffering from fever of the enteric group. On the sixth day the rash was well developed, especially over the back of the trunk and on the flexor aspects of the limbs. There was tenderness on palpation over the right costal margin, but no enlargement of the liver or spleen. On the seventh day the rash was fully developed all over the body, including a few spots on the face. Headache persisted, he did not complain of backache. The spots were pin-coloured, perceptible to the finger, and faded on pressure. They varied in size from typhoid-like spots to circular macules  $\frac{1}{4}$  in in diameter. On the ninth day signs of congestion were present at the bases of the lungs. On the tenth day the rash began to fade. The patient was listless and drowsy, and the pulmonary congestion gave rise to anxiety.

On the thirteenth day the patient passed his motions involuntarily in bed. On the sixteenth day the motions contained blood and mucus. The general condition was slightly better, as the incontinence of faeces did not continue. A starch, bismuth and opium enema was administered. The stool was subjected to microscopical examination, but no amœbæ were found. On the seventeenth day the rash had almost entirely faded, leaving a few brownish stains which disappeared in the course of the next ten days. No petechiæ were present. On the eighteenth day eight doses of magnesium sulphate were given—drachms two every two hours. This had no effect on the colitis. On the twenty-first day emetine hydrochloride gr  $\frac{1}{2}$  was given hypodermically morning and evening,

and repeated daily twice until twenty such doses had been given. On the twenty-second day the lungs were normal. The tongue was moist and covered with flakes of sticky, white coating. The stools daily consisted mostly of blood and mucus. On the twenty-eighth day a small, punched-out bed sore formed over the sacrum. The tongue was clean. The colitis continued. On the twenty-ninth day he passed the first stool without blood or mucus since the onset of the colitis, but in the evening the stool contained a little blood. The next day the stools were free from blood and mucus, and of watery consistence. On the thirty-sixth day the motions became soft, semi-formed, yellow in colour, but still rather frequent. On the forty-second day the stools became finally normal in frequency and consistence.

The bedsores healed slowly during the course of the next month. The patient, who had been much reduced by the illness, slowly regained his strength and weight. No bands of conjunctival congestion were noted as have been described in typhus fever, but there was a certain degree of bulbar congestion under cover of the lids. Towards the end of the fever and during the first few days of convalescence the patient displayed a weakness in protruding the tongue, which was tremulous, and inability to protrude that organ fully. On 19th July he was discharged from Hospital, fit and well-nourished. He was ordered a fortnight's rest before he resumed his clerical duties. Eighteen days later he died after an operation at which a gangrenous appendix and retro-cæcal abscess were found. It is interesting that a blood-count performed before the operation showed a polymorph percentage of only 70.5 which leads one to speculate as to the possible connection of this late complication with the early dysenteric lesions.

*Cases 2, 3, and 4*—On April 27th, a private follower of certain clerks of the Audit Department was admitted to hospital with fever. Three days later one of his masters was admitted with the same complaint, and on May 4th his other master, who was the father of the young lad whose case has been described, also succumbed.

All four men were fair-skinned. In all four cases the rash was similar, profuse, well marked and never petechial. The spots were most numerous on the trunk and upper arms, the face, if affected, showed only a few spots. A few spots appeared on the fifth or sixth day of the fever, the rash was fully developed on the third or fourth day of its appearance and then faded gradually until about seven to ten days later brownish stains were left which slowly disappeared without any marked desquamation. The watercourse appearance was not observed except in one case where there was a very faint mottling of the skin of the back on the day of the appearance of the rash.

In other respects these three cases resembled clinically that already described, except that bedsores and colitis complications were absent. The prostration was not so marked, nor was the tongue sign present except during the last two days of the fatal case. The patient might feel out of sorts for one day before the fever became evident to him. The general symptoms of fever were present—febrile aches and pains, headache—not so marked as in relapsing fever—and backache. Pulmonary congestion, as evidenced by crepitations and rhonchi heard over the bases of the lungs, appeared in each case from the third to the sixth day after the appearance of the rash, clearing up in about a fortnight in the three cases which recovered. The liver edge was noted as tender in the first case described, and the organ was slightly enlarged during the height of the fever in another case which recovered. No splenic changes were noted. In each case there was some degree of looseness of the bowels both during the fever and also during the first week or two of convalescence.

The two clerks made a rapid and complete convalescence. The private follower died. He was a well-nourished man admitted on the second day of fever. The rash developed on the sixth day. The next day he had slight epistaxis from the right nostril. On the ninth day the rash was fully developed and very profuse, being the most marked of the four, although the face was not affected. A brownish tinge was noted on the white-coated tongue. Pulmonary congestion developed on this day. On the thirteenth day he was doing excellently well and gave cause for no anxiety. Morphia hypodermics had been given for sleeplessness, and the effect, carefully noted, gave no contraindication to its use. On the fourteenth day, however, the patient was found to be apathetic, and was induced to take his nourishment with some difficulty. The pulse was good, there was no delirium, but the tongue was rather dry and crusted. On the morning of the fifteenth day he suddenly collapsed, and his sunken eyes and pinched features presented a remarkable change from his appearance on the previous day. Towards noon he passed into a condition of unconsciousness and died at 2-35 P.M.

The blood was examined in all cases several times and no spirilla or malarial parasites were found.

*Case 5*—The fifth case I submit as an example of mild, abortive typhus. The patient was a clerk from the same office as the other two audit clerks. He was admitted to hospital on May 9th, on the second day of fever. The blood was examined on the morning and evening of this day—no malarial parasites or spirilla were found. The patient was well nourished and had no symptoms at all throughout the fever except anorexia which persisted during the first three days of convalescence. The

spleen did not enlarge. On the fourth day a general blushing of the skin over the body and limbs was noted, and two pink spots were observed on the left upper arm. A few crepitations were audible over the base of the left lung. The next day the spots and erythema had disappeared and the lungs were clear. This patient was also fair-skinned. He made a rapid and complete convalescence.

*Case 6*—My next two cases were dark-skinned natives of South India. My private bearer was admitted to hospital on May 30th, on the third day of fever. The blood was examined on the third, fourth and ninth days without result. The fever commenced with a rigor and vomiting. On admission he complained of frontal headache, pain in the epigastrium and vomiting. The tongue was moist and coated with a brownish fur. The patient rapidly became extremely prostrated with a dry, brown, crusted tongue on the ninth day, which he was unable to protrude beyond the lips. The spleen was enlarged slightly but not palpable. No rash was observed and no lung signs, but the latter were not sought for too eagerly owing to the dangerous condition of the patient. After the first week of convalescence he emerged from his critical state and commenced to improve steadily. He made a complete recovery. This man had been inoculated with two doses of T A B vaccine twelve months previously.

*Case 7*—The other patient was a sepoy from the station garrison admitted on June 17th, on the third day of fever. The blood was examined four times without result. No rash was seen. Rapid prostration was marked. The tongue quickly became dry, and when the patient tried to protrude it, the tip caught on the lower incisors and the tongue was not protruded beyond the lips. This sign was well marked on the twelfth day and persisted up to the eighteenth day, when the tongue became moist and thickly coated with yellowish fur. There was diarrhoea during the early part of the illness and also during the secondary fever, the stools being of pea-soup colour and consistency. Pulmonary congestion appeared on the sixth day and on the eighth day the lungs were full of rhonchi and bubbling râles. From the ninth to the eleventh day the pulse was dicrotic, thereafter the blood pressure improved. On the twentieth day the patient, although very debilitated, appeared to be mending. The lungs were clear, the moist tongue, still thickly coated, with clean tip and edges, could be well protruded. The next day, however, a secondary fever supervened. On the twenty-fifth day the fur on the tongue assumed a brownish tinge. There was tenderness in both hypochondriac regions, but neither spleen nor liver was palpable. The blood showed leucopenia.

On the twenty-seventh day the heart assumed a fetal rhythm. The base of the right lung was dull on percussion, and the breath sounds diminished, there were no accompaniments

The patient gradually sank from exhaustion, the fetal heart rhythm persisting. Three days before death a few fine crepitations were audible over the bases of the lungs, so that this secondary fever probably denoted a low form of pulmonary inflammation which resulted in death about noon on the thirty-fourth day.

*Cases 8 and 9*—The last two cases were two Persians from the Seistan Levy Corps, admitted on the first and third days of July respectively. They had white skins, but their rashes were not nearly so marked as in the first four cases. Both were well-nourished men and did not appear to suffer much from the effects of the illness, as both were clamouring for release from hospital within a week of the subsidence of the fever. The symptoms consisted of febrile aches and pains and mild frontal headache. The blood, examined several times, was negative for malarial parasites and spirilla. Only one showed inability to protrude the tongue, this sign occurring from the ninth to the eleventh day. Both had well-marked enlargement of the spleen during the fever, and one had slight enlargement of the liver. Signs of pulmonary congestion, absent in one case, were present in the other on the sixth day, when slight hæmoptysis occurred. The rash appeared on the fifth day in one and on the eighth day in the other. In both it consisted of a mottled erythema and pink erythematous spots over the trunk and upper arms, appearing together. The spots, which did not become petechial, commenced to fade on the second to third day after appearance, and the mottling was the last element to vanish on the fifth to seventh day of the rash, leaving no desquamation or pigmentation.

*Case 10*—I had one more case, which was returned as fever of the enteric group, but to my mind resembled much more the fevers I have described. This was a sepoy of the Station Garrison admitted to hospital on August 5th, on the second day of fever. He was dark-skinned and no rash was observed. On admission he complained of slight headache, severe backache and pain over the front of the chest. The tongue was rather dry and lightly coated. The spleen was enlarged, but not palpable owing to the rigidity of the abdominal muscles. There was tenderness on palpation in the right hypochondrium. Signs of pulmonary congestion were present, there was diarrhœa with "pea-soup" stools. Blood examinations were negative. On the seventh day the spleen was palpable at the costal margin and did not enlarge further. On the ninth day the patient presented the prostrated condition of typhus, the tongue was dry and covered with innumerable cracks, its margin was red and raw, it could not be protruded beyond the lips owing to the tip catching on the lower incisors. There was no delirium, but the patient was very weak and had wasted considerably. The motions were watery, brown-coloured, and contained flakes of mucus tinged

with blood. The pulse was small and not dicrotic. The spleen was palpable at the costal margin, and liver edge palpable and tender. There was no jaundice and no distension of the abdomen. On the fourteenth day the diarrhœa ceased and the patient felt much better. There was still some lung congestion.

On the fifteenth day the spleen had receded under the costal margin and the liver edge was not palpable, although there was still tenderness on palpation in the right hypochondrium. A small, hard, tender swelling was noticed in relation to the under surface of the left lower jaw near the angle. This increased in size towards the middle line. A carious lower molar was extracted from the left side on the sixteenth day, but no pus was obtained. On the twenty-first day the abscess burst into the mouth, *via* the socket of the extracted tooth, and about 2 oz of foul, greenish-yellow pus was expectorated. By this time the lungs were clear, but the tenderness over the right costal margin remained. On the twenty-third day the wound in the neck commenced to discharge greenish-yellow pus, gradually a large slough separated. The wound cleaned and granulated, the patient put on weight and convalesced slowly. During the first four days of October he had a recurrence of diarrhœa, the motions containing large masses of mucus without blood. This responded immediately to a course of mag. sulph. The septic complication was, I consider, due to periostitis of the lower jaw. When the patient was transferred down the line towards the end of October he was fairly fit, the liver and spleen were normal.

Among these ten cases there were two deaths. The case of mild typhus was fit for duty after three weeks in hospital. The first admitted case was three months in hospital. The remainder, with the exception of the last case described, were fit for duty within two months of onset. My bearer has been in the best of health since his illness, and distinguishes himself on the football field by his zeal and agility. The clerks are fine specimens of their class and would do credit, in appearance at any rate, to any office.

In the fever charts I think that I could trace some similarity. The febrile course may be divided into two parts: the first part consisting of a more or less continued pyrexia, the second part of a lower, irregular fever tending to remittent or intermittent type, the two parts being separated by a break of pseudo-crisis or pseudo-lysis. Cases 1, 4, 6, 7, 8 and 9 show this feature most distinctly, the break occurring from the 8th to the 11th day. In cases 8 and 9 the second part of the fever is partially suppressed, which was in keeping with the mildness of the cases and the ill-marked rash as compared with the first four cases. Cases 2 and 3 do not show these features. Case 5, which appears to be an abortive form of this fever, shows a break on the eighth day with complete suppression of the terminal



fever In case 10 the terminal fever merges into the fever of the septic complication

## ON AN OUTBREAK OF RELAPSING FEVER IN TURKEY IN 1918

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TEL HADI

THE northern part of Mesopotamia, that is to say the country which lies between the rivers Tigris and Euphrates, consists for the most part of a very slightly undulating plain, crossed at long intervals by ranges of mountains—pimpled with extraordinary regularity by small roughly conical hills, some 100–200 feet high, called 'Tels'. This plain is watered by occasional streams and for two or three months in the spring is covered with a green herbage, which the advent of the hot weather about May changes to a brown dust. Towards the west this plain is populated by settled inhabitants who live in numerous villages, but to the east is uncultivated and inhabited only by wandering Bedouin tribes.

In this eastern part is a 'Tel' called by the Bedouins who used to camp about there in the spring of each year 'Tel Hadi,' and this was the spot chosen for the headquarters of one of the sections of the Baghdad Railway construction, when it was decided, during the war, to continue building this railway from Nisibin to Mosul. The Baghdad Railway was being constructed before the war by a German engineering firm, and this construction was continued during the war, for the Turkish government, by German engineers, mostly working with prisoner-of-war labour. Construction was commenced simultaneously at various points along the route, and the whole of the line under construction was divided for administrative purposes into sections. Construction in the Tel Hadi section was begun at the end of 1917, the rail-head then being at Tel Helif, 'three days' journey to the west.

In April 1918, when the outbreak of relapsing fever began, the section consisted of a permanent headquarters and various camps of workers which changed their position as the work progressed. The workers mostly lived in tents, and those generally black Bedouin ones. The German engineers, and a few of the more important employees, had houses of stone and mud. There should have been a German doctor in medical charge of the section, but the one who was sent was killed in an attack made by the local Bedouins and never replaced, and in consequence from February onwards I had the medical arrangements in my hands.

The hospital was accommodated in two wooden 'baraaques' and some stone houses and

tents. The arrangements were very makeshift and primitive, but we were lucky in having a good Leitz microscope and some stains.

Our cases were drawn from this comparatively isolated community of about 800 persons, of at least fifteen nationalities and speaking as many languages,—a circumstance which did not make it easy to obtain good histories from the patients.

The numbers were roughly —

<i>Cases of relapsing fever</i>		
British	38	1
Indians	404	8
Russians	28	10
Germans	7	1
Greeks	30	9
Armenians	25	6
Arabs	30	3
Jews	3	
Turks	150	16
Cherkas & Chuchins	15	8
Roumanians	5	
Italian	1	
Kurds	30	1
Maroccans	5	1
Algerians	30	2

### CLIMATE AND BLOOD-SUCKING FAUNA

The weather in 1918 was cold and wet until April, and then mild until the 10th of May, when the hot weather began suddenly. In May and June temperatures up to 43 degrees C were recorded inside a stone room in the hospital.

Lice were extraordinarily prevalent throughout the winter, but diminished in numbers as the weather grew hot and the measures for dealing with them became more effectual. A sensible diminution began in June. Everyone was more or less infected with them, but specially the Turks and Russians. Mosquitoes, both culex and anopheles, were numerous from May onwards, and from June onwards we were troubled by a very minute sand-fly. I never saw a bedbug or a tick. Fleas were fairly numerous up to May.

The whole of the headquarters was overrun with mice, and flies were very numerous during the whole of the hot weather.

### THE OUTBREAK OF RELAPSING FEVER

Relapsing fever first made its appearance in April, 1918, and continued till June, and it is this outbreak an account of which I think is of some interest, as, so far as I know, it is the only outbreak described in this part of the world, and the results of treatment were extraordinarily satisfactory. There is no disease I know so satisfactory to the doctor. With a microscope the diagnosis is certain, and with meosalvarsan, and no doubt with other arsenobenzene compounds, the treatment is wonderfully successful.

The course of the epidemic is shown in the following table.

The diagnosis was in each case made microscopically and no case occurred which was clinically relapsing fever, in which, at some stage or other, the spirillum was not found.

## THE SPIRILLUM

*Method of staining*—In all cases thin blood films were examined but I think perhaps a thick drop method would have been better as a routine procedure. The films were stained with Giemsa's stain and examined under 1-12 in oil immersion lens. The spirillum stains rather slowly to a dark purplish blue colour, and loses its stain easily if washed with water containing a trace of acid. This point is of some importance as if—as sometimes happened—the Giemsa did not colour the red corpuscles a nice red one was tempted to improve the appearance of the slide by washing it for a moment in very dilute acid. Its appearance was wonderfully improved, and malarial parasites thereby more easily seen but the relapsing fever spirilla were apt to be lost in the process.

## APPEARANCE

The spirillum as thus seen was very variable. It varied in numbers found from none at all (and this after 15 minutes' search in a case in which it was subsequently found) to many in each field. The thickness varied from ones so thin as to be hardly visible to a coarse organism like a mouth spirochete but in the same slide the thickness was fairly constant. Manson and Thornton who also noticed this variation, even suggest the possibility of there being two varieties of the Sp. Dutton on the strength of it (13). Its length was about  $20\mu$  and without accurate measurements seemed to be one of its most constant features (26).

The flexures were open and very irregular and in some cases the parasite took the form of a segment of a circle (13). This was possibly a change occurring when the film dried.

The ends were pointed.

The parasites were always found in the blood during some part of the attacks of fever, and never in the intervals when the temperature was normal. Out of 25 cases examined on the first day of the first attack of fever in five cases they were not found but in each of these cases were found on the second day. In one case only one spirillum was found on the first day after a long search and several on the second day (5).

This is a strong indication that the parasites in the first attack reach their maximum number late in the attack rather than early.

I could not find that the number of parasites found in the blood bore any relation to the clinical severity of the disease.

The parasites did not appear to be more numerous at one time of day than another. They were always extracellular, no case of phagocytosis being observed. The injection of neosalvarsan into a vein caused their rapid disappearance from the blood.

Unfortunately owing to want of apparatus and material, attempts at culture of the organism in vitro, and serum reactions could not be tried.

## THE VECTOR

The ordinary vector is certainly the louse, (30), (32), (33), (35), except in Africa where it is a tick—the *Ornithodoros moubata*. The bed-bug can carry the disease (29), and mosquitoes have been thought sometimes to do so (49). No one has discovered a flea doing so (13), (47).

There were many indications that our outbreak was due to lice—

(1) The cases were most numerous amongst the sections of the community which were most infected with lice. No cases occurred amongst the hospital staff, who were in daily contact with cases but had special facilities for keeping themselves free from lice. Very few cases occurred amongst the Indian prisoners of war, although these were more numerous than any other nationality. They kept themselves clean.

(2) Several times smears of crushed lice from relapsing fever cases were examined, and on one occasion an undoubted spirillum was found.

(3) There were no—or very few—bed-bugs or ticks, and sand-flies and mosquitoes did not make their appearance till the epidemic had started to decline. The disappearance of the disease corresponded with the disappearance of the lice.

(4) No cases of infection occurred so far as I could find in hospital. The patients were carefully de-loused on admission but relapsing fever cases were in no way isolated from those suffering from other diseases (cf 47).

## MODE OF INFECTION

It is probable that infection takes place not so often from bites of an infected louse as from inoculation of a crushed louse into scratches made when the patient feels the irritation of the bite (1)), (13).

## THE BREEDING OF THE PARASITE IN THE LOUSE

It is generally admitted that the organism breeds and is hereditary in the *Ornithodoros moubata* in Africa, and this is probably the case in the louse elsewhere, but the findings of various observers are not quite consistent (23) (29) (31). Leishman (34) has reported a 'granule clump' formation by the spirillum in the *Ornithodoros moubata* a sort of spore formation and J. Koch (29) a somewhat similar appearance in the louse.

## THE CLINICAL COURSE OF THE DISEASE

*The incubation period*—In this epidemic I had no indications of the length of the incubation period. It is usually given as from 2-10 days (11) (23), (47) but Manson and Thornton found about 7-14 days the usual time with variations from 2 to 17 (13).

## THE INFLUENCE OF SEX

In our epidemic only one case occurred in a woman to 65 in men, but this was nearly the proportion of women to men in the section



Other observers agree that males are much more frequently attacked than females (1), (2), (47)

### ONSET

The onset was always sudden, without premonitory symptoms, the temperature rising to 39-40 degrees C in about 12 hours. In the majority of cases the temperature rose in the evening or at night, and rigors were notably absent in distinction from malaria. The usual symptoms due to fever were observed. When first seen, usually on the first or second day, the patients had a peculiar lethargic manner. They were very docile, and rather slow in their movements, and seemed as if weighed down by terrible trouble. They did not (as was often the case with other diseases) try to impress the doctor by the seriousness of their illness. I thought their manner rather characteristic, and that I could usually decide if a patient had this disease or not when he first walked into hospital. I have since found that other observers have noticed a similar manner (13), and Bertier in Serbia (11) and Van Hoof in Africa (3) consider it characteristic. Portcalls in Salonika (4) notes a curious cry, as in meningitis, but with us this symptom was not present. This observer also notes that Kernig's sign often occurs.

### HEADACHE

Headache was invariably present, and perhaps, as various observers think (4), (9), more severe than one would expect to be associated with the rise in temperature.

### DELIRIUM

Delirium was only present in the one fatal case, and then only late in the attack, and of the low muttering type. This symptom appears to have varied much in different outbreaks. Some observers (16) consider early delirium an important diagnostic sign. While others (4), (17) are aided in diagnosing their cases by the absence of it.

### THE TONGUE AND BOWELS

The tongue was usually furred and moist and seldom the dark brown, dry, furred tongue one often sees in typhus. In some cases it remained clean until the third or fourth day of the attack.

The bowels were generally normal, but constipation was more common than diarrhoea.

### EPISTAXIS

Epistaxis in the initial stages was only observed in one case. In some outbreaks this has been noted as a common symptom [Vide (4), (11), and contra (13)].

### VOMITING

Vomiting was rare as opposed to Vandyke Carter (1) and others.

### RASH

A rash was never noticed, and most observers agree in this. It is difficult to see a rash in a patient covered with louse-bites, as most of our cases were, and though Vandyke Carter, the most

careful observer of the disease, has described one, it is, at any rate, not at all an obvious sign.

### THE LIVER

The liver was enlarged at the beginning of the attack in one case, the enlargement subsequently disappearing. This initial enlargement has also been noticed by v Hoesslin (9).

Jaundice occurred in one case without enlargement of the liver. Various observers have described a clinical type of the disease in which jaundice is a prominent symptom, and our jaundiced case fits in fairly well with this so-called 'bilious typhus type' [Vide McCowan (14)].

### THE SPLEEN

The spleen was enlarged in 30 per cent of our cases. Many observers agree that this organ enlarges progressively during the periods of fever and diminishes again during the intervals [Vide (7), (9), (47), and contra (13)]. There is no doubt that in most outbreaks this organ is frequently enlarged, but in the epidemic in E. Africa in 1917-18 (13), and in Macedonia in 1917 (5), this does not appear to have been the case and Delille (5) and others consider that in this latter outbreak an enlargement of the spleen indicated concurrent malaria. In the section until the relapsing fever was over we had very little malaria. It is noteworthy that in our one fatal case the spleen was *not* enlarged and this case was of the bilious typhus type in which McCowan says it is always enlarged (14).

A case of spontaneous rupture of the spleen on the fifth day is on record (15).

### JOINT AND MUSCLE PAINS

These were complained of in 21 per cent of our cases, but generally not until after the temperature had fallen as a result of treatment with neosalvarsan. In most outbreaks they are noted as common symptoms and some observers think they are important diagnostic signs (4), (9).

### HEART AND CIRCULATORY SYMPTOMS

Beyond an increased pulse rate in proportion to the fever these symptoms were not observed. Okuniewski (20) has noted that there is no obvious change in blood pressure in this disease.

### NUMBER OF DAYS

Number of case	1	2	3	9	11	13	45	46	64
1st period of fever	8	?	7	7	5	5	7	7	8
1st interval	5	8	8	230		12	6	?	5
1st relapse	5					?	?		
2nd interval	8	914	914	914		16			
2nd relapse	4								
3rd interval	13								914
3rd relapse	2								
4th interval	16								
4th relapse	1								

I have neglected this figure in the average as I think it probable that this patient, an extraordinary Russian, had a relapse, and did not appear at hospital. He only came to hospital on the last day of his first attack, and then stayed but one day.

## THIR RELAPSES

The attack of fever, with some or all the above symptoms, in the few of our cases where it was not cut short by neosalvarsan, lasted from five to eight days (average from 6.1). The fever then fell by crisis as suddenly as it had risen, often to below normal. Great sweating generally accompanied the fall of temperature, and the symptoms in favourable cases were rapidly ameliorated. After an interval of from 5-12 days (average 6.8) without fever, another attack generally occurred, very similar in its onset and symptoms to the first but generally of shorter duration. In the one case that was carefully observed through four relapses, the periods of fever became shorter and the intervals longer with each relapse.

The lengths of the periods of fever and intervals of the eight of our cases which had at least one period of fever uninterrupted by neosalvarsan are shown in the table above.

## COMPARISON OF OUR OUTBREAK WITH OTHERS

In the duration of the attacks and intervals, as well as in the symptoms our cases agree well enough with the classical description of the disease by Vandyke Carter and with most subsequent observers (4), (11) (12), (9).

In the outbreak in Serbia in 1916-17 (6), (7), however the attacks were shorter (3-3½ days, rarely 4 days) and this outbreak seems to have been altogether of a milder character—more than one relapse occurring but very rarely, and the mortality being practically nil.

The differences between our outbreak and the African one described by Manson and Thornton (13) are discussed below.

## THE DISEASE AS MODIFIED BY NEOSALVARSAN

After the administration of neosalvarsan the course of the disease is modified, and as in almost all cases this or a similar drug would be given as soon as the disease was diagnosed, it is this modified disease which is of the most interest.

On the administration of neosalvarsan the temperature does not fall until from 12 to 36 hours later (average 22 hours, one case took 48 hours and one 72 hours), and then by crisis. In the cases which subsequently relapsed the time taken for the temperature to fall was longer than in those which were cured by one dose (25.3 hours against 20 hours). In these cases, also, the time taken for the temperature to fall after the second dose of neosalvarsan was longer than normal (average 27.4 hours), and this seems to indicate that these cases were less reactive to the drug. On the fall of the temperature the other symptoms were, in favourable cases, all rapidly ameliorated, and the patient was fit to go out of hospital in 3 to 5 days.

In three cases the temperature rose again 2-4 days after the neosalvarsan, but spirilla were not found in the blood. In two of these cases it remained up for two days and the patients then made a good recovery, but in one case it

remained up for six days, until the patient died in a typhoid-like stage. Vandyke Carter has noticed a similar rise of temperature, without spirilla in the blood in some cases during the first interval.

## SYMPTOMS OCCURRING AFTER NEOSALVARSAN

I was unable to determine certainly how far the symptoms occurring after neosalvarsan were due to the disease or to the drug. They were, however, such as have been noted as common in cases of this disease which did not have this drug. The chief were severe headache from 2-4 days after the injection (31 per cent) and pains in the joints and muscles (21 per cent). In one case there was actual swelling of a joint (the left wrist).

Epistaxis occurred in 6 per cent of the cases and deafness or pain in the ear in 8 per cent [Noted as a common symptom by Toyota (12) and v. Hoesslin (9)]. Vomiting, irregular pulse, and giddiness occurred in one case each.

## RELAPSES AFTER NEOSALVARSAN

In the cases which relapsed after a dose of neosalvarsan, the relapse was much delayed, to from 14 to 30 days (average 19.0 days). During the interval after their recovery from the first attack (average 4.6 days) they were apparently quite fit until the relapse, which was similar in its onset to the original attack. In the one case which had a second relapse after two doses of neosalvarsan, each interval was 24 days.

In view of the long interval, it is quite possible that these relapses were really re-infections. Various observers have stated that little or no immunity is conferred by an attack.

The prolongation of the intervals after arsenobenzene compounds has also been noticed by Manson and Thornton (13) and Portocalis (41).

## THE ONE FATAL CASE

In the 66 cases only one death occurred  $\frac{1}{66} = 1.5\%$ , and this case presented some unusual features, which it may be of interest to describe shortly.

The patient was an Indian Mahomedan prisoner of war, who was sent into the headquarters hospital from a small working party, some 30 miles away, across a waterless desert. A film of his blood had been examined, and found to contain spirilla, four days before the patient himself arrived. On admission his temperature was  $38.2^{\circ}\text{C}$  and he gave a history of nine days' fever. He was very weak, his tongue was dry and furred, and he was deeply jaundiced. His spleen was *not* enlarged. At the time of his admission his blood did not contain spirilla, but he was given a dose of 0.3 gr neosalvarsan intravenously. His temperature fell in 12 hours but very collapsed he was. On the third day the fever returned, and he remained in a typhoid-like state for six days until he died. Five days before his death he developed a painful inflammatory swelling of his left

parotid—a symptom noted by Vandyke Carter in 2 to 3 per cent of his cases

This case is similar to the 'bilious relapsing fever' described by McCowan (14) and others

#### COMPLICATIONS AND SEQUELÆ

Our cases showed very few complications or sequelæ, possibly owing to the early employment of neosalvarsan. One case of facial paralysis occurred and one case each of bronchitis and conjunctivitis, but it is impossible to determine whether these were coincident accidents or not. Facial paralysis has been noted as 'common' in this disease by De Ruddere (42).

Other observers have recorded numerous complications, particularly of the nervous system, both psychosis (19) and paralysis (18) and meningitis (3). Bronchitis was a common complication in E. Africa in 1916 (13).

#### ASSOCIATION WITH OTHER DISEASES

Both typhus and malaria are often associated with this disease. Typhus one would expect since it also is louse-carried and occurs under similar conditions. At Tel Hadı we had no typhus, but in other parts of Turkey I am fairly certain that the two diseases occurred simultaneously, and cases of relapsing fever were diagnosed 'atypical typhus' for if such an outbreak occurs, it is not easy to distinguish the two without a microscope. An outbreak of either means that conditions are ripe for the spread of the other and its concurrence should be watched for.

Three of our cases had concurrent malaria, about the proportion to be expected from the incidence of the latter disease. The clinical picture is confused by superadded malaria, and some French writers (5), (6), (7) have divided their cases into three classes according as malaria is absent coincides with or follows the relapsing fever. Duchamp (28) even suggests there is a sort of symbiosis of the two parasites. With a microscope the differentiation is easy.

#### DIAGNOSIS

With a microscope diagnosis is easy and certain during the attacks, with the proviso that the spirilla are sometimes not to be found continuously throughout the periods of fever.

If the case is first seen after the initial attack is over, diagnosis is not generally possible until a relapse occurs. Van Hoof (3) in E. Africa has found that during this disease there is a leucocytosis of myelocytes and large mononuclears and a corresponding relative diminution of polymorphonuclears and small mononuclears, and suggests this can be used as an aid to diagnosis during the intervals when the spirillum cannot be found.

Without a microscope, however, the disease can rarely be diagnosed with any certainty until the first relapse, and an outbreak of this disease demonstrates very well how soon the cost of providing a bacteriological outfit is repaid in the lessened amount of sickness. This point is not

always conceded even in England, by the layman. In Turkey, and I think often in Germany, a microscope is looked on as an unnecessary luxury except for great bacteriological experts.

#### TREATMENT

There is only one form of treatment worth considering—the administration of an arseno-benzene which has a specific action on the spirillum. Obviously while the fever is high, the patient must be kept in bed, on a light diet, the bowels must be attended to, the headache may be treated with pyramidon and so forth, but the crux of the matter is—which and how much of the arseno-benzene compounds should be given and by which route?

The best route is undoubtedly direct into a vein. In three of our cases neosalvarsan was injected intramuscularly into the buttock, but it was found that this gave rise to very severe pain at the time of injection and inflammation afterwards. None of the cases actually developed an abscess which had to be opened, but one case appeared very nearly to do so. In the cases treated by intravenous injection, with the technique adopted no cases of the slightest local inflammation occurred, and the pain was limited to the prick of the needle.

As other observers (43) have recorded local trouble after intravenous injections of concentrated neosalvarsan and I have never come across a technique quite similar to the one adopted, I venture to give it at length.

#### THE TECHNIQUE ADOPTED FOR INTRAVENOUS INJECTIONS OF NEOSALVARSAN

The patient is given a strong purge, time is allowed for it to act, and if necessary the purge is followed by an enema. He is given no food for four hours before injection.

Two hypodermic syringes, one at least of 10 cc and two interchangeable needles are boiled in a clean saucepan in distilled water. The tube of neosalvarsan is scratched with a file and rubbed over with alcohol.

Meanwhile the patient is laid flat on a couch, his arm bared to the shoulder, the hollow of the elbow painted all over with iodine, and a piece of bandage tied round the upper arm tight enough to compress the veins. If the veins are indistinct one or two suitable ones are marked with indelible pencil before painting with iodine.

The operator washes and disinfects his hands as for an operation, fits together the two syringes, and draws up about 3 cc of the boiled, and still hot, distilled water into the 10 cc one. He breaks the neck of the neosalvarsan tube, and squirts the 3 cc of water in. The neosalvarsan dissolves at once, and is drawn up into the syringe, and distilled water drawn up till the total bulk is 6 cc. Any air is expelled and this syringe placed ready across the saucepan.

The operator now takes the other syringe and pushes it through the skin of the patient into, and a little way along inside, a vein, drawing

up some blood to make sure he is properly in. If he should, by accident, go through the vein and out the other side, as shown by a rapidly increasing local swelling, the syringe should be at once withdrawn and the operation restarted on another vein.

The needle being properly in, the bandage round the upper arm is loosened and the needle is left in its place while the syringe with the solution of neosalvarsan is substituted for the other syringe. Should a drop be spilt in the process it is immediately mopped up.

The neosalvarsan is now injected slowly and steadily at about the rate of 1 cc per minute, and when the injection is complete before removing the needle a few cc of blood are drawn up and returned two or three times to wash out any residual neosalvarsan in the syringe or needle. The syringe is then depressed so that the side of the vein comes against the hole at the end of the needle and the piston again withdrawn so that a partial vacuum is created inside, and the syringe and needle then quickly withdrawn. By this means a trace of neosalvarsan if still left inside the needle is sucked inside the syringe during withdrawal and not left in the tissues of the arm. It is not difficult to do.

A drop of collodion is put on the wound and a pad of wool. The patient is kept lying flat on the couch for at least one hour and is then taken away on a stretcher, put to bed, and kept on milk diet until the temperature falls.

By this technique none of the neosalvarsan can come in contact with the subcutaneous tissues of the arm. It should be remembered that any blood left in the syringes or on the patient's arm is infectious, and steps must be taken to destroy the organisms in it.

#### THE DOSE

The conclusion arrived at from observations in this outbreak was, that 0.45 gram neosalvarsan intravenously was the best dose.

In 30 cases 0.3 gram was given, and in eight of these cases subsequent relapses necessitated a further dose of 0.3 gram, and in one case two further doses. Amongst those 20 cases that had 0.45 gram in the first place, no relapses occurred. Some observers (3), (13), (42) have noted that neosalvarsan is more effective if given in the first attack, and we were fortunate in that respect in seeing our cases early—only three cases being treated with intravenous neosalvarsan for the first time during a relapse. Of these cases one had 0.45 gram and two 0.3, and none of them relapsed.

Patients suffering from this disease are said not to bear large doses of neosalvarsan well, and it is desirable that only just an adequate dose should be given.

The average time in hospital, after receiving an injection, of those that received 0.45 was 3.2 days, against 4.3 days in the first case of those

who had 0.3 gram, and a subsequent 6.25 days in the eight that relapsed.

The average time in hospital of the three cases who did not receive neosalvarsan, but who were not lost sight of, was 40.6 days, and of the 58 cases who received it either intravenously or intramuscularly was 6.8 days.

#### A table showing the results of treatment

Number of cases	Attack	Dose of 0.14	Hours for temp to fall	Days in hospital after injection	
20 1st		0.45	19.8	3.15	} No relapses
1 2nd		0.45	24	4	
20 1st		0.3	19.2	4.2	
6 1st		0.3	30	5.5	} Relapsed & given another 0.3 gram
1 1st		0.3	24	7	
1 1st		0.2	12	3	No relapse (a boy)
2 1st		0.3 twice			No relapse
1 During interval		0.3	Died 9 days later		
1 1st		0.3 into buttock	12	3	No relapse
1 1st		0.45 into buttock	12	31	One short relapse
2 1st		do	12	0	Relapsed and was given 0.3 intra-venously. Good recovery

#### ON THE USE OF OTHER DRUGS THAN NEOSALVARSAN

In the treatment of our outbreak, neosalvarsan was the only one of the various arseno-benzene compounds tried because it was the only one we had, but from the number of papers (11), (40), (42), (43), (44), (46) I have since found written to show other drugs are just as good as neosalvarsan, I gather that the latter drug is the best.

It is often stated (21), (50) that neosalvarsan does not work so well in this disease in Africa as elsewhere [Hegler (10) says the same thing of Palestine] and the Belgian doctors in E. Africa recommended 'Satoxyl' in preference to it. Manson and Thornton have however, concluded, after a very careful trial of many drugs including satoxyl that novarsenobillon is the best. I have not been able to discover what, if any, is the difference between this and neosalvarsan.

Of the drugs other than arseno-benzene compounds, Arrhenal (di-sodium-methyl-arsenate) is the only one I can find reported to have much effect, and this is recommended as a substitute for neosalvarsan when the latter is difficult to obtain by Dumitresco-Mante (46).

\* Satoxyl is —

Atoxyl	10 grammes	} Dose 3—4 c.c. intramuscularly twice weekly
Mercury Perchl	0.3 gram	
Pot iodide	2.5 gram	
Water	to 100 c.c.	

Serum treatment has not so far given very good results (41)

### PROPHYLAXIS

The obvious prophylactic measure is to kill the vectors—in this outbreak, lice,—and the most important fact in devising schemes to this end is that lice and their eggs are easily killed by a comparatively low degree of dry heat [ $55^{\circ}\text{C}$  for 30 minutes or  $60^{\circ}\text{C}$  for 15 minutes (50)]

In ordinary civil life, if one keeps oneself reasonably clean, one does not get lice, and the ordinary sanitary measures in such a country as England are quite a sufficient prophylaxis against the spread of this disease, but with troops under war conditions it is different, and during the war many elaborate and excellent schemes for de-lousing (according to Nuttall the word should be 'lousing') the troops were devised. These vary with the means at one's disposal, and to go into the matter is beyond the scope of this paper.

In the Tel Hadî hospital, our method, which proved quite effectual was, shortly —

Each patient on admission was deprived of all his clothes, shaved of all hair, and given a hot bath with soap. He then, when clean, was supplied with clean hospital clothing and clean bedding, and his own clothes, after being baked in a dry heat of more than  $60^{\circ}\text{C}$  for 15 minutes, were stored till he left the hospital.

All the hospital mattresses, bedding, linen, etc., were regularly baked in rotation. The clothing of the hospital staff was baked about once a fortnight, or oftener if any of them found lice in their things.

The floors of the hospital were washed or sprinkled with a suspension of chloride of lime in water.

Unfortunately, chiefly owing to the scarcity of fuel, we could not extend such a scheme to all the inhabitants of the section.

The heat of a tropical midday sun is quite sufficient to kill lice, and Wanhill (51) has dealt successfully with an outbreak of relapsing fever by moving the troops attacked out into camp on the banks of a river where they could wash themselves and their clothing and use the sun to destroy the lice and eggs. The lice in the houses occupied were left to starve, which they soon do if deprived of animals to feed on.

As remarked above, any blood, and possibly other fluids, coming from a relapsing fever patient, during the fever at any rate, is very infectious and must be destroyed. Scratching should be avoided, both by the prospective patient to allay irritation, and by the barber when shaving. As bedbugs can carry the disease these should also be dealt with.

In Africa, against *Ornithodoros moubata*, prophylaxis consists in personal precautions at night when the ticks feed, and disinfection of the tick-infected houses [Vide (50), page 218, etc.]

### APPENDIX

As an appendix I have added three notes —

- (1) On the invasion of tissues other than the blood by the spirillum,
- (2) On the mortality in other outbreaks,
- (3) On the varieties of relapsing fever, and a list of authorities quoted in the paper, with short notes to indicate the nature of the book or paper, arranged under the following headings —

- (1) General accounts of outbreaks
- (2) On special types of the disease, etc
- (3) On the spirillum and the vector
- (4) On the treatment
- (5) Accounts of the disease in text-books, etc

#### ON THE INVASION OF OTHER TISSUES THAN THE BLOOD BY THE SPIRILLUM

The invasion of tissues other than the blood by the spirilla has occasionally been reported. Brault and Montpelier (25) have found it in the sweat and tears, and perhaps in the cerebro-spinal fluid. Two other observers (4), (13), however, agree, that it is never present in this latter fluid, even in cases showing cerebral or meningeal symptoms.

Its presence in the urine too is very doubtful. Dudgeon (27) found a spirillum in 30 per cent of the urines of a series of relapsing fever cases. But Stoddard found that 46 per cent of the urines of healthy subjects treated similarly showed spirilla. Manson and Thornton (13) never found it in the urine, nor according to them does it seem to be present in the sputum unless contaminated by blood.

#### ON THE MORTALITY IN OTHER OUTBREAKS

The mortality in this disease, which used to be called 'famine fever,' is no doubt influenced by the often added condition of semi-starvation of the patients. It shows, however, I think, a tendency to decline, due perhaps to the introduction of treatment by arseno-benzene compounds.

Vandyke Carter's mortality was 18.02 per cent and in many of the outbreaks before his time was even higher, up to 50 per cent. In recent outbreaks it has varied from nothing or very little in Serbia in 1916 (6), and Macedonia in 1916-17 (4), (5), and E. Africa in 1917-18 (13) to 8 per cent in Manchuria in 1918 (12) and 17.18 per cent in Albania in 1916 (8).

#### ON THE VARIETIES OF RELAPSING FEVER

*Clinical varieties*—It is usually considered that there are at any rate two varieties of relapsing fever, the European and the African—the disease as seen in India, America and as recently described in Manchuria (12) not being essentially different from the European variety.

A very excellent account of the disease as seen in E. Africa, from observations on no less than 1,500 cases, has recently been published by





Manson and Thornton (13) The resemblances between this disease and the European or Indian variety are much more striking than the differences and there is hardly a feature in this description that cannot be matched in some outbreak or other in other continents

*The differences*—In the African disease, the temperature remains up in the first attack, for a variable period 'usually for three days' [(13), page 107] and in subsequent attacks for but two days or less (Precise details are wanting) This is the period given in the outbreak amongst the Serbs in 1916-17 (6), (7) but the rule in the European variety is 5-7 days Vandyke Carter reckons an average of seven days for the first attack, but says this figure is probably too big, as the patients in giving their histories were prone to exaggerate the length of their illness before appearing at hospital

The number of relapses in Africa amongst the W. African natives living in E. Africa is ordinarily five and up to eleven Amongst the E. African natives the relapses are as a rule fewer (in 30 per cent none at all), but up to nine have been observed In other continents more than four hardly ever occur The latter ones of these numerous relapses in the African variety are rises of temperature to from 99 to 100 degrees F for a few hours, and consequently would in all probability be overlooked unless the patients were under very careful observation That they were true relapses is shown both by their regular periodicity, and by the appearance of spirilla in the blood

In Africa the common vector is the *Ornithodoros moubata* and in other continents the louse Although lice were prevalent in E. Africa, Manson and Thornton bring some evidence that they never carried the disease there, but the evidence is not conclusive As Toyota remarks the *Ornithodoros* can carry the disease if introduced into other countries, and other animals, e.g., the bed-bug, can and probably do, sometimes carry it

Manson and Thornton found that spirilla were most plentiful in the blood at the beginning of the attacks and often disappeared towards the end This is directly opposed to observations in other continents, where the maximum number of spirilla in the blood is not reached before the third day of the fever

The observation of various previous workers (21), (50) that the African variety does not react so well to arseno-benzenes is not confirmed by Manson and Thornton

*Differences in the parasite*—Four varieties of the parasite are often described, the *Sp. Obermeieri* in Europe, the *Sp. Carteri* in India, the *Sp. Duttoni* in Africa, and the *Sp. Novyi* in America, chiefly owing to a paper by Novy and Knapp (22) in which this division was advocated Both morphological and serum reaction differences have been described in the parasites and differences in the clinical diseases they produce

The clinical differences have just been dealt with

Nuttall (23) and Bayon (24) in 1912, Macfie and Yorke (26) in 1917, and Toyota (12) in 1919 have all concluded that there are no recognisable morphological differences between organisms from different parts of the world

The serum reaction differences are by no means clear and precise and various observers do not agree at all amongst themselves as to them Toyota (12), after a long and careful research, thinks that the so-called species can be transmitted by prolonged passage through animals I think this observer (who although he writes in that language is not a German) comes to a safe conclusion in saying "Es ist unserem jetzigen Wissen nach unmöglich die Rekurrenssporiochaeten in verschiedene Arten einzuteilen"

#### GENERAL ACCOUNTS OF OUTBREAKS

- (1) Vandyke Carter, H  
Spirillum Fever London, 1882  
A large book of 450 pages, devoted to a most careful and detailed description of the disease as seen in Bombay in 1877-80  
Sir Leonard Rogers refers to it as the classical account of the disease
- (2) Walker, E. A  
Spirillum Fever in India L. M. S. Gazette, 1905, p 320  
Only a letter with some details, from memory, of an outbreak on the North West Frontier
- (3) Van Hoof, L  
Note préliminaire sur la fièvre récurrente parmi les troupes dans l'Est Africain Allemande Bull. Soc. Path. Exot., Paris, 1917, x, pp 786-791  
A clinical description of an outbreak in East Africa
- (4) Portocalis, A  
Sur l'épidémie de la fièvre récurrente observée récemment en Macédoine Bull. et Mém. Soc. Méd., d'Hôp. de Paris, 1917, 3, s. xli, p 780  
A clinical description of the outbreak amongst the Greeks in Macedonia in 1916-17 (800 cases)
- (5) Armand Delille, P Garsin and Lemaire, H  
Les principaux caractères de la fièvre récurrente à l'armée d'Orient Bull. et Mém. Soc. Méd., d'Hôp. de Paris, 1917, 3, s. xli, pp 778-780  
A clinical description of a small outbreak amongst the French troops in Salonika in 1916-17 (50 cases)
- (6) Duchamp, C. J.  
Contribution à la pathologie des Balkans La fièvre récurrente des Serbes Bull. Acad. de Méd. Paris, 1917, 3, s. lxxvii, p 372.  
A clinical description of the disease amongst the Serbs in 1916
- (7) Duchamp  
La fièvre récurrente chez les Serbes. Prog. Méd., Paris, 1917, 3, s. lxxvii, 10-12.  
A clinical description of an outbreak in Servia 1916-17 (71 cases)
- (8) Weiner, E  
Ueber eine Recurrensepandemie Méd. Klin., Berlin, 1917, xvi, p 1043  
A description of an outbreak in Albania in 1916-17 The statements are often very vague and statistical details are wanting
- (9) Von Hoesslin, H  
Zur Klinik des Rückfallfiebers Münch. Med. Wochschr., 1917, lxi, pp 1065 & 1106  
A long paper with a very full clinical description of the disease The therapy is not well treated of



- (10) Hegler  
Erfahrungen über Febris recurrens Wein Kln Wochsch, in Palastina 1917, xxx, p 547  
A short report of a medical meeting and discussion. One of the speakers a Dr Apostolides gives shortly clinical details of more than 950 cases he had had in Palestine
- (11) Bertois  
*La fièvre récurrente* Jour de Méd et  
A general description of the European variety of the disease, clinical and pathological. The world distribution is dealt with at length
- (12) Toyota, H  
Studien über die Recurrens spirochæten in Mandschurien Kitasato, Arch Ex per, Med, Tokio, 1919, pp 13-84  
A long and careful paper describing—  
(1) Various experiments on the inoculation of spirilla into animals, and serum reactions  
(2) The clinical features of an outbreak in Manchuria (70 cases)
- (13) Manson, J K & Thornton, L H D R A M C Journal, East African Relapsing Fever 1919, August pp 97-116 Sept, pp 193-216  
A long and very good account of the disease in East Africa (1,500 cases)
- ON SPECIAL TYPES OF THE DISEASE, etc
- (14) McCowan, W T  
Bihous typhus and relapsing fever I M S Gazette 1906, pp 387-396  
A detailed clinical account of the bihous typhus type of the disease
- (15) Jansig & Jurinec  
Ueber einen Fall von Milzruptur bei Febris recurrens Wiener Kln Wochsch, 1917, xxx, p 1651
- (16) Porat, A  
Delire et reactions psychomotrices dans la fièvre récurrente de l'Inde Bull Soc Path Exot, Paris, 1917, x, pp 532-536  
On early delirium as a prominent symptom in N Africa
- (17) Parrot, L  
Du délire et des réactions psychomotrices dans la fièvre récurrente algérienne Bull Soc Path Exot Paris 1917, x, pp 692-694  
On the absence of delirium in N Africa
- (18) Yacoub, K  
Spirochætal dysentery and post spirochætal paralyses during an epidemic of relapsing fever Practitioner, Lond 1917, xciv, pp 487-491  
A good paper, clear, short, and to the point
- (19) André Thomas, Loygue & Levy  
Vallensi, J  
Accidents nouveaux au cours du Revue neurol, Paris typhus récurrent considéré 1918, xxx, pp 216-220  
Only one case
- (20) Sterling Okunewski, S  
Blutdruck im Verlaufe von Rückfallfieber Deut Med Wochsch, 1918, p 265  
Concludes—'Es wird also im Laufe von Rückfallfieber meist kein deutlicher Einfluss der Krankheit auf den Blutdruck beobachtet'
- (21) Redford, J H & Duke, H L  
A case of Spirillum fever in R A M C Journal, (German) East Africa 1919, Jan, pp 78-81
- ON THE SPIRILLUM AND VECTOR
- (22) Novy, F G & Knapp, R S  
Studies on *Sp. Obermeieri* and related organisms Jour Infect Dis cases 1906, Vol III, pp 291-393  
A paper of over 100 pages and mainly responsible for the division of relapsing fever spirilla into the four species
- (23) Nuttall, G H F  
Herter Lectures, 1912 I Spiro Parasitology, 1912, Vol v, pp 262-274  
A very good summary of the evidence for the louse as the vector. The author concludes that there is only one species of *Sp. recurrentis*. Some interesting notes are given on the life history of the louse from experiments
- (24) Bayou, H  
Experimental transmission of the spirilla of European relapsing fever to rats and mice Ibid, p 135  
Concludes that there is no morphological difference between *Sp. recurrentis*, *Sp. Duttoni* and *Sp. Novy*
- (25) Brault, J & Montpellier, J  
Note sur la présence du spirille de la fièvre récurrente en Nord Afrique dans quelques liquides et excréta de l'économie Bull Soc Path Exot, 1914, Vol VII, p 172  
The 'liquides et excréta' are the cerebro spinal fluid, the sweat and the tears
- (26) Macfie, J W S & Yorke, W  
The relapsing fever spirochætes Ann Trop Med & Parasitol, Liver pool, 1917, xi, 81-85  
Concludes that there is no morphological difference between the various species of *Sp. recurrentis*
- (27) Dudgeon, L S  
Examination of the urines in cases of relapsing fever occurring in Macedonia Lancet, London, 1917, ii, pp 823-825  
The author found spirilla in 27 out of 82 cases, but it is probable that these were not *Sp. recurrentis*
- (28) Duchamp, C J  
Fièvre récurrente Presse Med, Paris, 1917, xxx, 210  
Suggests a symbiosis of the *Sp. recurrentis* and the malaria parasite
- (29) Koch, J  
Zur Uebertragung des Erregers des europäischen Rückfallfiebers durch die Kleiderlaus Deut Med Wochsch, 1917, xlv, pp 1066-1094  
The author thinks the spirilla breed in the louse and gives good microphotographs of clusters of spirilla somewhat resembling those found by Lieshman (v 134)
- (30) Mayer, M  
Die Uebertragung des Relurrens durch Lause Munch Med Wochsch, 1917, xlv, 70
- (31) Mayer, M  
Zur Uebertragung des Erregers des europäischen Rückfallfiebers durch die Kleiderlaus Deut Med Wochsch, 1917, xlv, p 1231  
The author doubts the breeding of spirilla in the louse
- (32) Wiese, O  
Zur Uebertragung des Rückfallfiebers Deut Med Wochsch, 1918, pp 60-62  
Implicating the *P. Capitis* and *P. pubis* as well as the *P. Vestimentorum* as European carriers

- (13) Töpfer, H  
Zur Uebertragung des Trägers des Deut Med  
europäischen Rückfallfiebers Wochsch, 1918,  
durch die Kleiderlaus p 239
- (14) Leishman Sir W B  
A note on the 'granule clumps' Ann de l'Inst  
found in ornithodoros moubata Pasteur Paris  
and their relation to the spirilla 1918, xxvii, 49-  
of African relapsing fever 59  
A short paper These 'granule  
clumps' seem to be functionally  
at any rate a kind of spore form  
ation
- (15) Lloyd, Li  
Lace and their menace to man Oxford Med Publ  
1919 (Relapsing  
fever, p 100)  
A treatise on the habits and life of  
the louse

## ON THE TREATMENT

- (16) Inver-en Ueber die Wirkung des Munch Med  
neuen Arsenpräparates Erlich's bei Wochsch, 1910,  
Rekurrens No 5  
52 cases with four relapses
- (17) Smiroff Die Anwendung der Sal Deut Med Wochsch,  
varsan bei febris recurrens 18 Ap 1912  
201 cases with 17 relapses
- (18) Conseil, E & Bienassis, E.  
Traitement de la fièvre récurrente Bul Soc Path  
par le néosalvarsan d Erlich Exot, 1912, Vol  
I, p 476  
On the advantage of neosalvarsan  
over salvarsan
- (19) Foley H & Violette, C  
Traitement de la fièvre récurrente Ibid, 1914, Vol vii,  
par le néosalvarsan et l'Olarsol p 598  
12 cases were treated with 914, with  
no relapses
- (20) Conseil, E  
Le Galyl et Ludyl dans le traite Ibid, 1914, Vol vii,  
ment de la fièvre récurrente p 101  
Thinks Ludyl and Galyl as good  
as 914, but only tried them on 4  
and 6 cases, respectively
- (21) Portocals, A  
Le traitement de la fièvre récurrente Compt rend Soc  
Completing (4) Galyl was used in de Biol, Paris  
82 cases with indifferent results 1918, lxxvi, 273
- (22) De Ruddere  
La fièvre récurrente spinillaire, et Arch Med belges  
son traitement aux troupes de Brux 1917, lxx  
l'Est Africain Allemand. pp 710-713  
Recommends 'atoxyl' in pre  
ference to neosalvarsan
- (23) Mühlens, P  
Arsalytsbehandlung besonders beim Deut Med  
Rückfallfieber Wochsch 1917  
Thinks arsalyts just as good as  
neosalvarsan xlvii p 1167
- (24) Kostoff, K H  
Arsalytsbehandlung beim Rückfall Ibid p 1169  
fieber  
The author is a Bulgarian colleague  
of the above 'Armeehygieniker  
Herr Generaloberarzt Prof  
Mühlens, and tried both ars  
alyts and 914 under his instruc  
tions
- (25) Löwy R  
Zur Klinik & Therapie des Rückfall Med Klin, Berlin  
fiebers 1918, xiv, p 62  
A short paper and not very precise  
His treatment is 0.45 gram of 914
- (26) Dumitresco Mante  
Injections intraveineuses d Arrhenal Presse Med, Paris  
dans la fièvre récurrente 1918, xxvii, pp  
155-156

The author recommends Arrhenal 3  
gram intravenously, but only  
tried it on 8 cases His dosage is  
15 times the maximum dose given  
in the Extra Pharmacopœia

## ACCOUNTS IN TEXT BOOKS, Etc

- (47) Babonneix, L  
Recurrent typhus or relapsing fever, Mondo Med, 1916,  
etc xxvi, pp 193-212  
A general description of the disease  
but not drawn to much extent  
from the author's own cases
- (48) Rogers, Sir Leonard  
Fevera in the Tropics 1919  
An excellent summary of the disease  
as seen in India, and the clinical  
differences between this form and  
the African
- (49) Castellani & Chalmers  
A Manual of Tropical Medicine 1919
- (50) Memoranda on Medical Diseases in H M Stationary  
the Tropical and Sub Tropical War Office, 1919  
Areas  
Particularly good summary of the Relapsing Fever, pp  
disease 214-221
- (51) Wainhill, Lt Col, R A M C  
Relapsing Fever A Rough, but R A M C Journal,  
Effective Method of dealing with 1919, Aug, p 178  
the louse in India

REFERENCE TO ARSENO BENZENE COMPOUNDS  
IN THE TREATMENT OF RELAPSING FEVER

SALVARSAN	(13),	(36),	(37),	(38)
NEOSALVARSAN	(13),	(38),	(39),	(40), (45)
ARSALYTS	(bis methylanino tetramino arseno benzol)	(43),	(44)	
OLARSOL	(* composition)	(39)		
LUDYL	(Phenyl disulph amino tetraoxy diamene diarseno benzene)	(40)		
GALYL	(Tetra oxy diphosphamino diarseno benzene)	(11), (13), (40), (41)		
ATOXYL	(Sodium amino arsenate)	(13)		
SATOXYL	(r, p 21)	(13)	(42)	

## NOTES ON INFLUENZA

By J H McDONALD,

LIEUT-COLONEL I M S

DURING the winter of 1918-19, the bacterio-  
logical examination of sputa in cases showing  
influenzal symptoms revealed the almost in-  
variable presence in large numbers of a Gram-  
negative cocco-bacillus—an organism not found  
prior to this in pneumonic conditions in Abbotta-  
bad The cultivation of this proved it to be the  
coli type of the Friedlander group In the face  
of general opinion it was difficult to associate  
this with the epidemic then prevailing, but the  
fact that in five cases this organism was ob-  
tained in pure culture from pleuritic effusions  
naturally raised a doubt, which could not be  
removed by further observations owing to the  
cessation of the disease During this last win-  
ter, noting again the predominance of this  
cocco-bacillus I carried out observations in  
connexion with over 200 cases which have  
forced me to the conclusion that this organism  
is playing a great, if not the chief, part in the  
present epidemic for the following reasons—

1 Its invariable predominance in the sputa  
of nearly all (95 per cent) laryngeal and pneu-  
monic cases and its presence almost in pure cul-  
ture in over 40 per cent of the cases

2 The total absence of any organism like the influenza bacillus or pneumococcus even on repeated examinations of sputum from the same case and entire failure to obtain evidence of either even on selective media

3 Its highly pathogenic properties— $\frac{1}{2}$  cc of a broth emulsion injected under the skin being a lethal dose for a quail or pigeon with death in 8 to 12 hours and 5 cc for a rabbit or guinea-pig proving fatal in 18 to 24 hours. The organs show all the signs of acute septicæmic poisoning and the cocco-bacillus is found in, and can be cultivated from, the blood

*Morphology*—Its pleomorphism is evident in both sputum and cultures

In cultures its variations are dependent on the medium and on the cultures being primary or secondary. The following table shows the development according to these factors —

A. Medium	B Primary Culture	C Secondary Culture
(1) Blood Agar	Short stout bacilli with coccid forms	Smaller cocci with more slender and frequently longer bacilli
(2) Ordinary Agar	Mainly coccid and diplococcal forms	All coccid forms
(3) Broth	Mixed coccid, diplo coccid and bacillary forms	Similar
(4) Boiled white of egg	Mixed forms as in (3), but smaller and with but few bacillary forms	Mainly coccid and diplococcal
(5) Gelatine Slope	Seldom obtained and then showing only coccid forms	Nil
(6) Gelatine Slab	Growth scanty and limited to surface—chiefly coccid forms	Nil

Transference from (3) or (4) to (1) shows the same as C (1) usually and rarely B (1)

*Cultural characteristics*—The growths on various media correspond with those of Friedlander's pneumo-bacillus differing, however, in the following respects —

(1) Its growth on various media is by no means exuberant except in broth and sometimes on blood-agar and boiled egg-white. On ordinary agar and gelatine only the short stout cocco-bacillary form develops as a rule, and then scantily, showing mainly coccid forms. Even when extensively prevalent in sputum, cultivations prove a failure

(2) Encapsulated forms are rarely seen in sputum or cultures unless the latter be passed through a bird or animal, when they become evident

(3) The lanceolate form is rarely seen, the bacillus being either an elongated coccid form or sausage-shaped. Except the diplococcal form, pairing is seldom seen, the bacilli grouping themselves in palisade fashion

*Relationship of germ to disease*—A comparison between the conditions found clinically and bacteriological findings tends to strengthen the opinion that this cocco-bacillus plays a great, if not the chief, part in the causation of the

disease. The following table represents the comparative states —

Bacteriological	Clinical
1 Short stout cocco bacillary forms predominant	Symptoms very severe Septicæmic conditions marked, involvement of lung not proportionate. Sputum thick and gangrenous (green and foul smelling)
2 Coccid and diplococcal forms predominant	Symptoms vary according to severity of infection. Septicæmia as marked as (1) if infection severe sputum yellowish or yellowish green semi liquid with tinges of rust or bright coloured blood
3 Coccid forms only	Symptoms mild Septicæmia not marked. Sputum yellowish and semi liquid

*Mode of infection*—This, as far one can see, is entirely through the respiratory system

*Nature of infection*—This appears to be a sapræmia more than a septicæmia for the following reasons —

(1) Repeated examinations of blood smears taken *ante mortem* from the peripheral circulation and *post mortem* from the heart and lungs show the presence of no organism while at the same time the sputum may be swarming with them

(2) Cultures made from the blood, ante- and post-mortem, prove negative

(3) Cases clinically showing no pulmonary abnormality till the patient is moribund and then only a congestive condition, prove fatal from a pharyngeal or laryngeal affection, the sputum alone exhibiting the presence of the cocco-bacillus in one of its forms

*Chronic infections*—From my observations it would appear that the existence of a chronic influenzal infection has not been fully realized. Cases not infrequently met with are considered, owing to the hectic nature of the temperature and signs of pulmonary disintegration or empyema to be due to tubercular infection. Repeated examinations of the sputum reveal no tubercle bacilli, but the presence in considerable quantity of the same micro-organism with staphylococci or streptococci. Sajous in his Encyclopedia points out the occurrence of such cases in pure influenzal affections and Besson in his Manual of Bacteriology shows the effects of mixed infections. We ought, then to remember not only the possibility of such chronic conditions but the dangers arising to the public by neglect of measures to prevent the spread of the disease for most people will keep clear of a patient acutely infected but in ignorance will not avoid a chronic case

*Treatment*—Much has been written and said about gargles of various kinds. While not depreciating the value of these one is brought face to face with incontrovertible facts, showing how such useful information can prove a source of raillery for the misbeliever. The facts are these —

(1) What percentage of the Indian population will actually take the trouble to gargle



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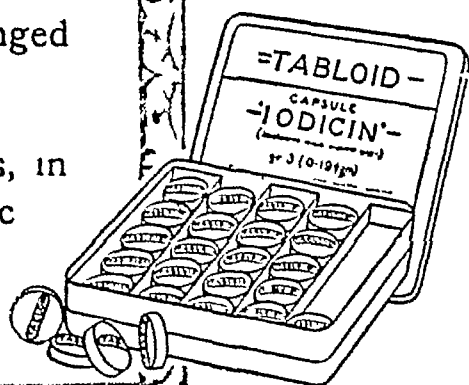
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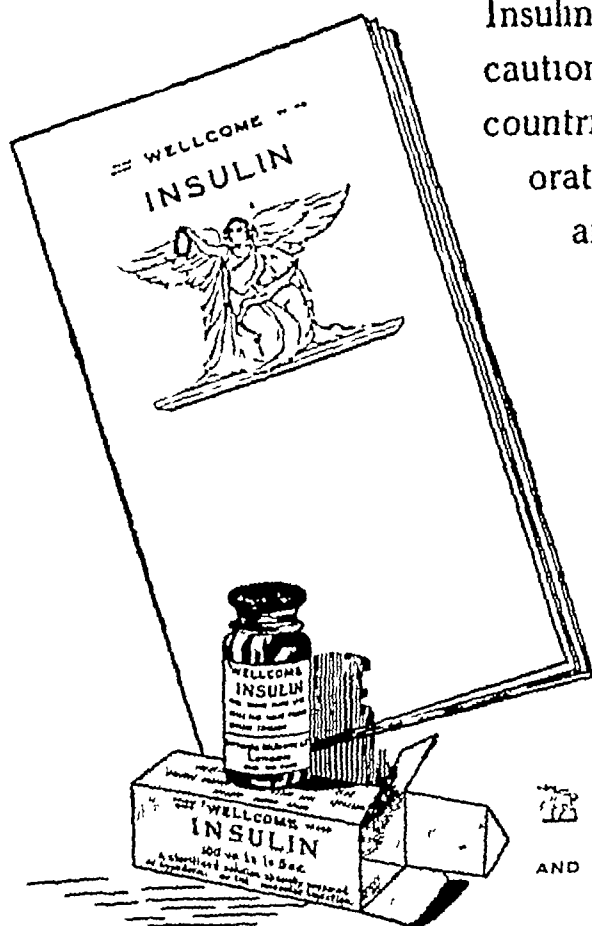
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## Original Articles.

### ON THE RESULTS OF ANTI-MALARIA MEASURES IN FIVE TOWNS IN THE UNITED PROVINCES

By J A S PHILLIPS, DPH

MAJOR I M S,

*Assistant Director of Public Health  
(Malariaology), U P*

#### PART I

##### I SAHARANPUR

IN the year 1909 Major J C Robertson, I M S, who was then Special Malaria Officer for the United Provinces was instructed to carry out a malarial survey of the town of Saharanpur

The health of this town was reported to be unsatisfactory and malaria was said to be very prevalent

This survey was carried out in 1909, and a full report was submitted to the Government of the United Provinces by the Sanitary Commissioner in February 1910

Major Robertson's findings amply confirmed all that was said as to the unhealthiness of the town

Briefly summarised these findings were as follows —

(1) That malaria was very prevalent in Saharanpur

(2) That during the months May to November 1909, deaths from malaria formed 1/3rd of the total number of deaths in the town

(3) That the average annual infantile mortality for the 25 years preceding 1909 was 349.5 per mille, that malaria was directly the cause of 29 per cent of these deaths, and if deaths under the heads "born weakly," "premature births" and "inanition" were ascribed to the effects of malaria on pregnant women, as to it practically all these are attributable, 58 per cent of this infantile mortality was caused by malaria

(4) That the annual death rate exceeded the annual birth rate

(5) That 2,101 out of 2,665 children between the ages of 2 and 10 years examined had enlarged spleens, i.e., 78.8 per cent of them

(6) That 53.8 per cent of blood films taken from unselected persons were found to contain parasites

(7) That considerable water-logging occurred, and that this was chiefly caused by extensive irrigation to the north and west of the town

(8) That the chief breeding grounds of carrier anopheline mosquitoes were "irrigated areas under rice and sugar cultivation

to the west of the town, the low lying marshy ground at the south-western corner, and several stream drains on the outskirts"

(9) That owing to the large amount of irrigation the spring water level was raised, "in very few of the fields is the water so far as eight feet from the surface of the ground at the end of the rains, and in most places it is only from three to five feet"

(10) Certain recommendations were then made to deal with the problem of malaria at Saharanpur which will be taken up in detail later. The greatest emphasis, however, was laid on the curtailment of irrigation and the stoppage of wet cultivation within half a mile of municipal limits

Following on the report submitted by Major Robertson, a committee was appointed to go into the matter and to prepare estimates for the works required to be done

In 1912, the Government of India sanctioned a grant of Rs 1,80,000 for the purpose of carrying out anti-malarial work at Saharanpur. This sum was considerably increased later and practically all the recommendations made were eventually carried out, but it was not until September 1918 that the bulk of these recommendations were reported as having been completed, whereas certain borrow pits and tanks in connection with the Oudh and Rohilkhand Railway were not finally dealt with as recommended until January 1923

The recommendations made in the original report were as under —

Recommendations	Action taken
(1) Stoppage of canal irrigation approximately for an average distance of $\frac{1}{2}$ mile from the edge of the city proper	Ordered from March 1914
(2) Prohibition of rice cultivation within half a mile of the town	Ordered in 1912
(3) Filling in of tank F in Major Robertson's Map E with its upper extension the borrow pits marked K, all within the railway fencing to such a level as to ensure their draining through the existing syphon into the Dhamola river*	Not commenced until 1920 and not finally completed until 1923
(4) Filling in of pits and hollows near Marsh marked M and the raising of the whole area if possible to the top level of Craigie nala	Reported completed in September 1918
(5) The filling in of tank E and surrounding area.	Reported completed in September 1918
(6) Craigie nala—an extension of the brick lined bottom of this nala from the point marked D on Map E to its conjunction with the Dhamola, and the filling in of side breaches of the existing bricked portion of the deeper central channel	Work begun in 1914

\* *See* Map I

## Recommendations

## Action taken

(7) Cilkana road drain — The last 800 feet of this drain from Haji Kamal bridge to the Pandhoi nala which is unlined to be lined with masonry with a cunnetted base.

Above this reach the existing plain masonry base to be cunnetted and above this again where the drain is again unlined it should be lined with masonry with a cunnetted base at least as far as Shripur distributary.

Work begun in 1915

(8) The Pandhoi river — Work begun in May 1915 To complete and extend the masonry bed in which the Pandhoi runs in its course through the city proper both downwards to the junction with the Dhamola and upwards to the north for 30 yards.

The effect of these anti-malarial measures on the health of the town —

Dealing first of all with the vital statistics of the town a very marked improvement will be noticed in the general health of Saharanpur.

The following two tables speak for themselves —

Table A for ten years 1899-1908 taken from Major Robertson's report —

Year	Total mortality per mille per annum	Fever mortality per mille per annum	Birth rate per mille per annum
1899	48.64	40.3	57.03
1900	47.03	38.8	44.15
1901	49.28	39.5	40.56
1902	5.49	40.9	41.47
1903	55.18	19.2	39.41
1904	44.16	36.8	38.46
1905	47.86	40.9	35.42
1906	57.61	51.7	35.00
1907	68.71	57.6	24.32
1908	42.44	41.9	25.93

Average for ten years.	51.4	44.7	38.2
------------------------	------	------	------

Table B for ten years 1913 to 1922

Year	Total mortality per mille per annum	Fever mortality per mille per annum	Birth rate per mille per annum
1913	42.21	16.58	49.75
1914	51.08	28.25	49.32
1915	48.72	29.00	50.77
1916	42.54	23.99	48.62
1917	54.51	29.67	52.57
1918	80.51	58.82	48.59
1919	44.01	28.11	50.55
1920	55.21	37.51	50.08
1921	50.30	31.09	46.50
1922	35.59	21.09	54.68

Average for ten years	50.5	30.4	50.1
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Table C—A comparison of the average annual statistics for the two decades under consideration —

Decades	Average total mortality per mille per annum	Average fever mortality per mille per annum	Average birth rate per mille per annum
1899-1908	51.4	44.7	38.2
1913-1922	50.5	30.4	50.1

The total number of births during the decade 1913-22 in Saharanpur amounted to 31,451 and the total number of deaths in the same period to 31,673 so that the total mortality exceeded the total number of births by 222. This was largely due to the influenza epidemics of 1917 and 1918. In 1918 the total number of recorded deaths was 5,063, nearly double that of the average annual mortality for this decade.

There is as has been repeatedly pointed out a considerable margin of error in these vital statistics in so far as "cause of death" as reported is concerned. All cases where fever has been a symptom in the course of the disease are returned under the heading of "fever". In the influenza year of 1918 no less than 3,697 out of the total of 5,063 deaths were reported under the heading of fever, whereas the bulk of these cases were probably caused by influenza.

A better system of reporting deaths would have probably revealed a much improved state of affairs as far as malaria is concerned and more in keeping with the results obtained from other and more reliable methods of investigation.

Turning, therefore, to these methods, the results obtained were almost astounding and are detailed below —

**Spleen index**—In 1909 Major Robertson examined a total of 2,665 children between the ages of two and ten years and of this number no less than 2,101 or 78.8 per cent of them were found to have enlarged spleens.

In 1923, I examined a total of 2,720 children and only 198 or 7.3 per cent of them had enlarged spleens.

This enormous difference can be better visualised when seen in tabular form —

Year	Total number of children examined	Number with enlarged spleens	Percentage with enlarged spleens
1909	2,665	2,101	78.8
1923	2,720	198	7.3

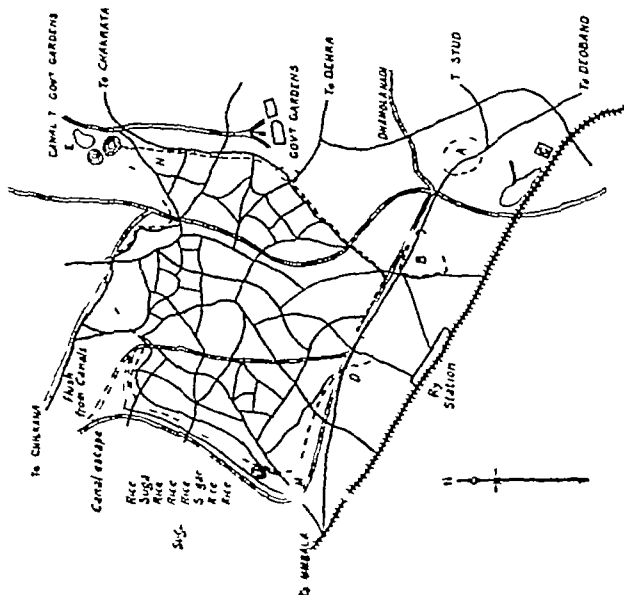
A careful record of the exact locality of the town from which every child who was examined, came, was kept so as to be able to compare the figures for 1923 with those



# SAHARANPUR

## References

- Limit of inhabited area
- A--- Khan Alamgura
- B--- Pathanpura
- C--- Cemetery
- D--- Adab Octroi post
- E--- Brick fields
- F--- Low lying ground
- H--- Bugh Mathura Das Octroi post
- Roads and Streets
- Railway
- Canal and Streams



## SAHARANPUR

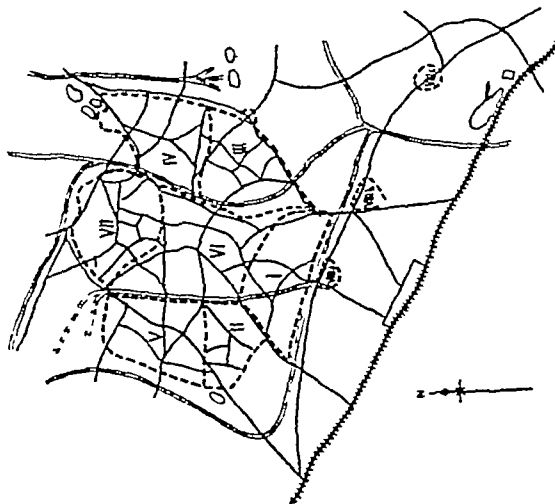
### Sketch Map

### OR

## SAHARANPUR

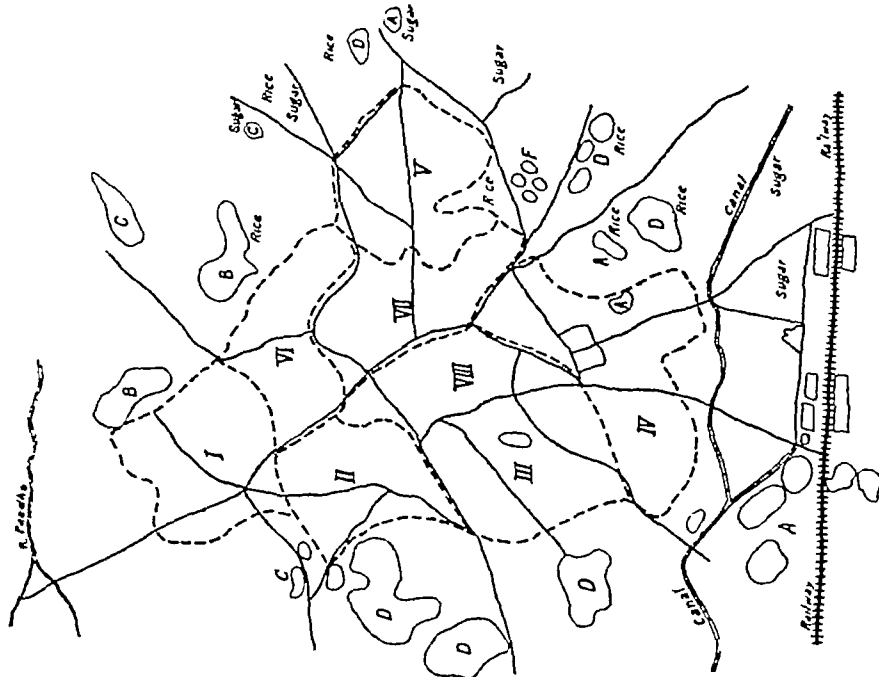
Showing distribution of malaria as indicated by the spleen census

Scale 1 : 2000



Areas	Spleen index 1909	Spleen index 1923
I	78.8%	5.10%
II	90.2%	7.29%
III	74.8%	3.01%
IV	76.1%	9.07%
V	85.4%	8.08%
VI	60.8%	3.09%
VII	84.1%	4.06%
VIII	75.6%	11.92%
IX	76.6%	11.05%
X	80.0%	3.94%

## NAGINA



References  
 --- Boundary of section  
 --- Roads and streets  
 --- Tanks  
 --- Canals and rivers

obtained in 1909 in each of the sections into which Major Robertson had divided up the town in his report

The following is a table of comparison between the figures obtained for each of these areas in 1909 and those found by me for the same areas in 1923

A copy of the map showing how these areas were divided by Major Robertson is also attached for reference, Map 2

Sections	Spleen index obtained in 1909	Spleen index obtained in 1923
I	78.8	5.10
II	90.2	7.20
III	74.8	3.01
IV	76.1	9.07
V	85.4	8.08
VI	60.8	3.09
VII	84.1	4.06
VIII a	75.6	11.92
VIII b	76.6	11.05
VIII c	80.0	3.94

In addition to the children seen within municipal limits, 30 children from villages outside the municipal limits were also seen in some of the schools visited. Of this number 11 or 36.66 per cent of them had enlarged spleens, and it was noted at the time that these spleens were considerably enlarged.

Had a larger number of children from these villages been examined the percentage of those with enlarged spleens would probably have been found to be much higher.

The deduction is obvious and goes to prove—if any further proof were necessary—that the decrease in the amount of endemic malaria in Saharanpur city is directly attributable to the anti-malarial measures carried out there.

*Parasitic index*—Blood slides taken from a number of unselected children, as was done by Major Robertson, were examined for parasites and whereas Major Robertson found parasites in 53.8 per cent of the slides he examined, only 10.3 per cent of those taken by me contained parasites.

It will thus be seen that an enormous improvement has been brought about at Saharanpur as far as the incidence of malaria is concerned as a result of the anti-malarial measures carried out here,—results that will bear comparison with those obtained almost anywhere in the world.

In these days when statements before they are accepted require proof, and plenty of it, it is gratifying to consider that here in Saharanpur there is irrefutable proof of the value of anti-malarial works if carried out thoroughly.

The results obtained at Saharanpur are a glowing testimony to the accuracy and thoroughness with which Major Robertson

prepared his original report in 1909 and to the value of the recommendations he then made, as also to the munificence of the government of India in providing funds which exceeded 3½ lacs of rupees to carry out these recommendations.

When results such as these have been obtained in a comparatively short space of time it seems incredible that one of the measures on which Major Robertson laid most stress in his report—i.e., the stoppage of canal irrigation within three-quarters of a mile from the edge of the city and which has been in force since 1915,—should now be ignored.

It is understood that a U P Government order was issued in 1922, cancelling the previous order which stopped canal irrigation within the limits stated above.

Major Robertson's reasons for considering canal irrigation in the immediate vicinity of and within the municipal limits of Saharanpur to be the chief cause of the high rate of malaria in the town are best expressed in his own words—

In Saharanpur the permanent and important breeding grounds are few in number and, with one or two exceptions, are all due to the one cause,—irrigation. On the surface the remedy seems easy but interference with irrigation, and especially irrigation already established, raises economic difficulties and disadvantages of importance. Without certain modifications in the irrigation, however, there seems little hope of much improvement in the condition of the town, and it is necessary to consider what can be done without seriously interfering with agriculture or causing hardship to the cultivator. Irrigation may be either from wells or from canals, and from the point of view of malaria the two systems are of very different importance. In well irrigation every bucket of water given to the crop means additional labour to the cultivator, and the natural tendency is to reduce the quantity to a minimum and to prolong the intervals between irrigation to a maximum. It is rare to find a field irrigated from wells which would be a suitable breeding ground for mosquitoes. Moreover, the water used is all taken from the subsoil, and the quantity which sinks into the ground again is much reduced in volume by evaporation. A lowering of the spring level is the result and that in proportion to the extent of the irrigation, so that the natural subsoil drainage is improved. In canal irrigation very different conditions obtain. Water is turned on to the field at regular intervals. The cultivator, getting his supply without additional labour and, having paid for it, is keen on getting full value for his money, and the field is flooded to its full capacity. Frequently the ground never becomes really

dry between these floodings and mosquitoes are able to breed freely. All this water, too, is brought in from outside and the volume which sinks into the ground is additional to the natural supply and the spring level is raised. This tendency is further strengthened by the reduction of well irrigation in the same area and its lowering effect on the ground water level. To the west and north of Saharanpur, canal irrigation is very extensive and comes quite close up to the edge of the town. In this area the subsoil drainage is in a direction towards the south-east. On the north-east there is further irrigation and here the direction of drainage is towards the south-west.

"From the west, north and north east all this subsoil drainage converges towards the city, and as a consequence the ground water level on these aspects is very high. In few of the fields is the water so far as eight feet from the surface of the ground at the end of the rains, and in most places it is only from three to five feet. To substitute well irrigation in such areas would appear to be no great hardship on the cultivators. It is true that it would cause a fall in the level of the ground water, but, if this did not exceed twelve to fifteen feet from the surface, the hardship would still be no extraordinary one, and it would be of incalculable benefit to the city. To what distance from the border of the town this substitution of well for canal irrigation should extend it is impossible to say. The results, as manifested by the lowering of the spring level, can be the only guide, but probably the limit laid down in the resolution of January 1895 would suffice, i.e., one mile. No rigid standard, however, should be adopted, but the effect on the ground water carefully watched and the extent of irrigation diminished accordingly. In this connection it should be remembered that a fall in ground water level would affect favourably other diseases besides malaria. 'Respiratory diseases' are very prevalent and phthisis is common. These would be influenced for the better by any decrease in water-logging and dampness. Further, on general sanitary grounds, we have every reason to expect that 'diarrhoea and dysentery' would be considerably lessened. Of the interference to agriculture, and of questions of loss in revenue, I am not in a position to write. With reference to the former, however, it may be pointed out that the population of Saharanpur is much greater than that of the area which would be affected, and as to the latter, Government, I am certain, would not allow a question of a slight loss of revenue to interfere where the health of a large important town was at stake."

The Executive Engineer (Irrigation branch), E and J Canals at Saharanpur informs me

that since the new order directing the opening up of the canals the area now irrigated is practically the same as it was before the anti-malarial campaign was started.

Certain restrictions have been ordered to guard against wastage, and the Executive Engineer insisted on all guls and water channels being thoroughly repaired before he allowed water into them. But as he very rightly points out irrigation goes on by night as well as day and cannot be checked at night time at any rate. The water channels and guls will deteriorate in time and conditions will in the near future become what they were when Major Robertson first reported on Saharanpur.

He has very kindly sent me figures showing the amount of irrigation that is now being done since the receipt of the new orders.

These figures with his comments are added as an appendix to this report.

The whole of this question raises problems which economists might delight to argue about, "should prosperity be considered before wealth?"

To the sanitarian there is only one answer to the question and it is a firm negative.

Major Robertson advocated the substitution of irrigation from wells for canal irrigation and for a period of six years his recommendations were carried out. Is there any obvious or imperative reason why they should now be disregarded?

#### APPENDIX.

The Executive Engineer's report on the subject —

I find that all the colabas feeding the debarred anti-malaria area (which were removed when irrigation was stopped in this area) have now been put back and the irrigation is steadily increasing. The figures of irrigation done in the area are —

Rabi 1329	15 acres
Kharif 1330	209 "
Rabi 1330	412 "

As I explained to you before allowing the colabas to be put back I insisted on the guls being put in really good order and would not put back the outlets till this was done, but I cannot ensure that their condition will be maintained at the same high level. In any case I cannot ensure that wastage will not occur, as our canals run at night as well as by day and when opened cannot be closed quickly. A special watch is being kept on this area, this will reduce waste but does not ensure against it. Also you know how quickly things are lost sight of as changes are made in establishment and there is little doubt that in time conditions of irrigation in the area will be much as formerly. In consequence if it is proved that the stoppage of irrigation in the past caused a material improvement in the health of the city it would appear better to close it off again as health is of the first importance. Well irrigation does not offer the danger of wastage of water which canal irrigation does because (1) it is carried out by day light (2) it is all done within the near vicinity of the well and if a gul is breached it must be at once seen and either repaired or the supply stopped, and (3) water lifted from a well is too expensive to waste or even use too plentifully. Irrigation can be done from wells and was done when the supply was shut off and such practice tends to reduce the subsoil water level.

In 1923 a similar lot of blood films from unselected children were examined and only 6 per cent contained parasites

This is in keeping with the reduction in the amount of endemic malaria as gauged by the spleen index

One is justified, therefore, in concluding that there has been an enormous improvement in the health of the inhabitants of Nagina as far as malaria is concerned, as a result of the anti-malarial measures carried out there, and one might reasonably expect this improvement to continue

It is up to the municipal authorities to see that the two drains, the north cut and the south cut, are suitably maintained so that they function as they were meant to, also to complete such of the minor recommendations as still remain to be done

There is sufficient proof of the benefits that have accrued from the work that has been done to justify the expenditure of money on the original scheme, and any further sum of money spent in completing the original recommendations, would, I consider, be well expended

(To be continued)

#### CHRONIC DYSENTERIC PERITONITIS AS THE PROBABLE CAUSE OF A COMMON FORM OF ASCITES IN THE TROPICS

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and

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CAPT, I M S,

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In a note in the *Indian Medical Gazette* of September, 1921, one of us (J W D M) brought forward evidence which pointed to chronic peritonitis resulting from bacillary dysentery as being the cause of the commonest form of ascites in India. Ascites which requires repeated tapping is a very common condition in India. It is usually regarded as being caused by cirrhosis of the liver, but the evidence on which this view is based is very slender. The victims on the whole are not addicted to alcohol to a greater extent than the rest of the community, they do not show the other evidences of cirrhosis such as dilatation of the veins of the epigastrium, they usually survive several tapplings, whereas patients who have ascites due to cirrhosis seldom live to be tapped more than once. The most important point of all is that when an autopsy is obtainable, the condition which is found is one of chronic fibrosis of the

peritoneum and the liver is not found to be cirrhotic

This paper contains further evidence on the subject. The previous note received less criticism than was expected considering the somewhat revolutionary nature of the views which were expressed. One criticism which was made was not easy to reply to, this consisted in the definite statement by a medical man that he had seen about a hundred cases of the disease, and that he had never come across one in which there was a history of antecedent dysentery. It happened that there were three cases of the disease in the Hospital of the Calcutta School of Tropical Medicine at the time when the criticism was made and the critic was given an opportunity of interrogating these patients, all of whom gave definite histories of having had dysentery a short time before the onset of the disease. No other observer has reported that he has failed to obtain a history of recent dysentery in the majority of his cases, and all the further enquiries which have been made by the senior author and others support the observation that the majority of the cases have had dysentery or severe diarrhoea shortly before the onset of the disease. It is not claimed that all cases of ascites in India belong to the clinical group which is dealt with in this note, but only that the majority of the patients who have ascites as their chief symptom owe their disease to bacillary dysentery.

The other criticism which has been made is that it is not justifiable to suggest the existence of a chronic dysenteric peritonitis on the evidence which has been brought forward. The facts which were recorded in the previous paper and in this one must speak for themselves in this connection.

The one serious difficulty in accepting the view has not been raised by others, but by the senior writer himself. It is that we should expect to see some of these cases in course of development among the numerous cases of jail and army bacillary dysentery which are under observation for considerable periods after recovery from their attacks.

The only answer which could be given to this objection appeared to be that these cases are treated by salines or other purgatives, so that the retention of the irritant toxins in the bowel is not likely to occur to nearly the same extent as in the case of persons who are untreated or are treated by the usual sedative or astringent domestic remedies.

When this point was discussed with two of the workers at the School of Tropical Medicine, Dr McVail and Dr Napier, both of them stated that they had seen a good many cases of the disease occurring as a sequela of dysentery among tea garden coolies and war

refugees in Persia Dr G C Ramsay and Dr McCombie of Assam have also informed me that they have seen many such cases in patients who had recently suffered from bacillary dysentery. All of these medical men had regarded the association with dysentery as being almost a commonplace one, but yet there is no known reference in the literature which suggests that the condition occurs as a sequela of dysentery.

It is still the usual view of medical men in India that the common form of ascites is usually associated with cirrhosis of the liver. It is important that the disease should be assigned to its true position as it is one of the common causes of death in India. The disease is usually ignored, the patients are tapped and sent away, they are of little interest to the surgeon who derives little credit from their treatment, he can give temporary relief by tapping, but the fluid rapidly accumulates again.

The tables show the results of a series of agglutination tests carried out by the junior writer in the Hospital for Tropical Diseases, the technique being the same for the patients and for the controls. The results obtained by him correspond very closely with those obtained in a series of cases examined in the King George's Medical College of Lucknow by a number of the colleagues of the senior writer and the clinical manifestations are so similar to those observed in the Lucknow series that there is no need to deal with them again in detail.

In the previous paper it was suggested that the clinical, pathological and bacteriological evidence pointed to the existence of a chronic peritonitis caused by the passage of irritant toxins through the bowel wall, it was believed that the toxins were derived from bacilli of the dysentery group.

The views expressed in the previous paper may be briefly summarised as follows—

I There is a common form of ascites in India and probably in many other tropical countries which is usually assumed to result from cirrhosis of the liver.

II In most of these cases there is a history of dysentery or severe diarrhoea which has occurred within a few weeks before the onset of the disease.

III Agglutination against the Flexner group of organisms is found to exist in high dilutions much more frequently in these cases than in unselected control cases.

IV In one case in which death occurred within a short time after the onset there was a sub-acute localised peritonitis whose distribution corresponded closely with that of the active bowel lesions of bacillary dysentery, in other more chronic cases there was diffuse fibrosis of the peritoneum associated with evidences of lesions of bacillary dysentery in the bowel.

These observations pointed to the occurrence of a chronic peritonitis in some cases of bacillary dysentery which had been treated by astringent domestic remedies, and it was believed that the peritonitis was caused by the passage of the toxins of dysentery bacilli from the lumen of the bowel into the peritoneal cavity. The irritant was believed to cause a chronic peritonitis followed by fibrosis of the peritoneum, the fibrosed peritoneum being incapable of checking the exit of fluid from the vessels lying under the peritoneum or of absorbing the fluid which had already been poured out. The nutritive fluids of the body were thus discharged into the peritoneal cavity and so starvation, combined perhaps with intoxication, was caused. The previous paper should be consulted by those who are interested in the subject, as the clinical aspects of the disease are there more fully dealt with than in the present note.

The special object of the present research was to find out whether the disease shows the same features in Bengal as in the United Provinces and to test the agglutinating powers of a larger series of controls than had been dealt with in the previous series.

The patients who were examined are divided into three groups—

I Those who appeared to fall within the clinical group of ascites following after dysentery.

II Controls who gave a history of recent dysentery.

III Controls who gave no history of recent dysentery.

It is noticeable that there are cases in both of the first two groups in which agglutinins were not present in the higher dilutions, this is not surprising as agglutinins often disappear after the attack of dysentery has come to an end, sometimes indeed they may not have been present at all.

It is also seen that the cases in the ascites group show evidence of the existence of agglutinins against the Flexner bacillus in a larger proportion than is found in the non-ascites group with a history of recent dysentery.

There are two reasons for this, one is that in some of the control cases the dysentery was amebic, the other is that ascites is more likely to occur among patients who are made than among those who have made a recovery. Agglutinins would be more likely to persist among the carriers than the specific average series of cases of recovery from dysentery. Details of the findings are given in tables, comparative table showing the results obtained in a standardised to capacity and were used

for test after allowing all the coarse particles to settle

4 Dilutions of sera (absolutely free from all erythrocytes) were made with sterile normal saline in multiples of 10

5 Different volumes of serum and bacterial emulsion were sucked up in narrow-bore-tubes of homogenous glass with intervening bubbles of air to keep them separate

6 Tubes were left in the incubator at 37°C for 2 hours over a bowl of water to prevent evaporation

7 Readings were taken after half an hour at room temperature and the highest dilution at which coarse flocculi were seen with a hand lens was noted as the end point of the reaction

### SUMMARY AND CONCLUSIONS

The histories of the cases recorded, combined with the clinical and bacteriological findings, strongly support the view which was previously stated by the senior writer that the commonest form of ascites in India is not due to cirrhosis of the liver, but to a fibrosis of the peritoneum resulting from irritation of the peritoneum by the toxins of the bacilli of dysentery. The name which is suggested is "Chronic Dysenteric Peritonitis." The treatment of the disease is unsatisfactory in most cases unless there is some co-existing disease which is an important factor in causing the ascites. If there is such a co-existing disease its cure may lead to a restoration of the balance between exudation of fluid and its re-absorption.

The best prospect of controlling the disease lies in the proper treatment of bacillary dysentery by salines. This treatment brings about the rapid removal of the bacillary toxins from the intestine, and thus there is little tendency for the toxins to escape through the bowel wall to the peritoneum.

The disease is very common in India and it is important that its true nature should be recognised, otherwise there will be no effective attempt to control its occurrence.

It is desirable that every case of ascites should be investigated with a view to finding whether it falls into this group, at the same time other possible causes of ascites should be considered.

Cirrhosis of the liver is of fairly common occurrence in India, but it is believed by the writers that it is not nearly so common as chronic dysenteric peritonitis. The disease is well worthy of attention by surgeons, in the cases in which fluid accumulates slowly in the peritoneum it is quite possible that some system of drainage into the subcutaneous tissues may be capable of dealing with the excess fluid. Tapping should only be resorted to when absolutely necessary, it leads to the more rapid outpouring of fluid

and consequently to the more rapid starvation of the tissues

### A NOTE ON THE VALUE OF PROPHYLACTIC INOCULATION IN THE PREVENTION OF CHRONIC CARRIERS OF TYPHOID AND PARATYPHOID BACILLI\*

By J. A. CRUICKSHANK, M.D.,

MAJOR I.M.S.,

Director, Pasteur Institute of Southern India Coonoor

THE diagnosis and control of chronic carriers is one of the most important preventive measures in dealing with the enteric group of fevers. This is done in the Army by sending all convalescents to an Enteric Depôt for bacteriological examination, those found to be chronic carriers being invalided out of the service. In England the Public Health Authorities have certain powers to enable them to deal with carriers and to prevent their engaging in occupations in which they may be a source of danger. It is the chronic carrier by whom these diseases are perpetuated. The temporary convalescent carrier is of less importance because he comparatively quickly ceases to excrete the bacilli, whereas the chronic carrier continues to do so for years and frequently for the rest of his life. I think it will be generally agreed that if the chronic carrier could be eliminated, enteric and paratyphoid fevers would cease to exist. Any method either of prophylaxis or treatment which helps towards this end would, therefore, be of the greatest value.

It struck me that prophylactic inoculation might have some effect on the production of chronic carriers. I therefore examined the records of the carriers whom I have isolated to see if I could throw any light on this point. I found that in my series the percentage of chronic carriers was very much higher among the uninoculated than among the inoculated and that the majority of the chronic carriers dealt with had not been thoroughly and efficiently inoculated. This result is certainly interesting and, though the number of carriers is small, I think it is worth recording because the effect of inoculation on the production of the carrier state seems to have received little or no attention. The only reference I have been able to find to detailed work on the subject is in a paper by Fletcher(1) who examined 1,000 soldiers convalescent from the dysentery and enteric groups in England in 1917. None of his 8 chronic carriers—3 of B paratyphosus A and 5 of B paratyphosus B—had been inoculated with the triple vaccine, i.e., T A B. This point in Fletcher's paper does not appear to have attracted much notice. In the article on enteric fever in the recently published *Medical History of the War* it is stated that "fully 2 per cent of the unprotected become carriers and that in those

\* Read before the Medical Research Section Indian Science Congress, Bangalore, 1924

protected by triple vaccine it is probable that the proportion is much lower," but detailed figures are not quoted

1,886 British soldiers convalescent from the enteric group of fevers passed through my hands at the Parel Enteric Depot towards the end of the War. The vast majority of these men had contracted the disease in Mesopotamia. I propose to confine my remarks entirely to the inoculation state in the chronic carriers found among these convalescents.

There were 32 per cent of chronic carriers among the uninoculated and 0.5 per cent among the inoculated. The percentage of chronic carriers among those inoculated with simple typhoid vaccine was 0.56 all of whom were carriers of B paratyphosus A. 0.3 per cent of those inoculated with triple vaccine become chronic carriers.

I have records of 12 undoubted chronic carriers: 8 of B paratyphosus A, 3 of B typhosus and 1 of B paratyphosus B. All these cases were under observation for at least a year except the carrier of B paratyphosus B who was observed for only seven months, at the end of which time, however, he was excreting the bacilli regularly. The details regarding inoculation of these chronic carriers is shown in the following table —

TABLE I  
Inoculation State of Chronic Carriers  
B paratyphosus A

Uninoculated	2			
Inoculated with simple typhoid vaccine (T V)	4	1, 4 months before illness		
		2, 18	"	"
		3, 20	"	"
		4, 22	"	"
Inoculated with triple vaccine (T A B)	2	1, 10	"	"
		2, 11	"	"
		(only received 1 dose)		

B typhosus

Uninoculated	1			
Inoculated with T A B	2	1, 14 months before illness		
		2, 15	"	"

B paratyphosus B

Inoculated with T A B	1	9 months before illness		
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I submit that only 4 at most of these 12 carriers had been thoroughly and efficiently inoculated. These results are in close agreement with those of Fletcher already quoted. They show that efficient prophylactic inoculation has the effect of reducing the number of chronic carriers resulting from an epidemic of typhoid and paratyphoid fevers to a very marked extent.

Everyone is now agreed on the great value of inoculation in diminishing the incidence and severity of this group of diseases. I would claim from these figures its effect of reducing the number of chronic carriers as an additional argument in its favour.

Treatment of the enteric fevers by vaccines has never come into general use although good results have been reported from time to time, especially in American literature.

In conclusion I would offer the suggestion that these figures may be taken to indicate the advisability of again trying vaccine therapy in these diseases, at any rate in uninoculated subjects with a view to still further preventing the manufacture of chronic carriers.

REFERENCE

Fletcher *Journal Royal Army Medical Corps*, Vol XXX, 1918, p 72

In the discussion on Major Cruickshank's paper, Major J. Cunningham, M.S. remarked "I consider this a most important paper. There is no doubt that the enteric group of fevers is mainly carried by the 'chronic' carrier. Any method which will diminish the incidence of this type of case is bound to demand the most careful attention. Figures of this kind are very difficult to obtain in any quantity because the numbers of carriers which become chronic are comparatively small. It is most important therefore that all observations bearing on this question should be recorded and I hope that Major Cruickshank's figures will receive the prominence they deserve. His suggestion that the disease itself should be treated with vaccines with a view to preventing the chronic carrier state is also worthy of attention. Specific vaccine treatment of the acute stage has not been received with much favour. If however, it should prove to have an effect in the prevention of the permanent excretion of the typhoid bacillus, it would be well worth re-introducing for this reason alone, quite apart from the want of beneficial effect on the acute stage of the disease."

A FURTHER NOTE ON THE EFFICACY OF THE ESSENTIAL OILS IN THE PREVENTION AND TREATMENT OF CHOLERA

By Dr J. W. TOMB, OBE, M.A., M.D., DPH,

Chief Sanitary Officer, Asansol Mines Board of Health

In a former article (*Indian Medical Gazette*, June 1923, p 257), I drew attention to the value of essential oils in the prevention and treatment of cholera, and now desire to record the results of the use in the Mining Settlement during the year 1923 of the essential oils mixture\* mentioned in my original article.

Cholera in this note, as in the former, has a strictly clinical significance and means a communicable disease characterised by purging with watery colourless stools, accompanied by vomiting, muscular cramps and suppression of urine.

\* R]

Spt. Aether	m 30
Ol Cloves	m 5
Ol Cajaput	m 5
Ol Juniper	m 5
Acid Sulph Aromat	m 15

Misce

Dose — One drachm, in half-an-ounce of water, every half hour. Total average dose 8-10 drachms.

For Contacts — One drachm in water, once or twice daily while risk of infection exists.



During the year under review, as in former years, a considerable number of cases of vomiting and purging but unaccompanied by muscular cramps and suppression of urine were also notified which have not been included in the statistics, though they were undoubtedly cases of true cholera in its earlier stages. Had these cases been included, the results of treatment with the essential oils mixture recorded on p 233 would be even more favourable than they are.

The disease with which we are now dealing, whatever its bacteriology, is in all other respects epidemiologically identical with that which has existed in the Mining Settlement under the name of cholera from time immemorial, and for the prevention and suppression of which the Mines Board of Health was specifically created, and cannot be distinguished from the disease reported as cholera by the village chowkidars throughout India and recorded as such in the returns of the Directors of Public Health without challenge or bacteriological verification.

It is hoped, however, in a later article to go fully into the bacteriology of the disease as found in the Mining Settlement.

The year 1923 was an unusually healthy one in every way, only 345 cases of cholera being reported as compared with an average annual number of about 1,100.

In my former article it was seen that, since the establishment of the Mines Board of Health up to the period now under review, for every two cases of cholera which occurred in the Mining Settlement from drinking contaminated water, etc., at least one additional case occurred from contact—generally amongst those engaged in the actual nursing of patients,—notwithstanding the very elaborate measures taken by the Board's staff in every case to prevent such an eventuality.

Of the 345 cases of cholera reported this year only 27 cases were due to contact, none of which contacts—either from failure to notify the original cases in due time, or from their unwillingness to accept it, had received a prophylactic dose of the essential oils mixture. There were, therefore, 318 cases of cholera in the Settlement during the year *not due to contact*, in connection with which under ordinary circumstances 159 additional cases due to contact were normally to be expected. Only 27 such cases, however, occurred—and these only as stated above amongst contacts who for one reason or another had not received any prophylactic doses of the essential oils mixture. It may, therefore, be reasonably assumed that the disease was certainly prevented from developing in no less than 132 cases of contact by the prophylactic use of the essential oils mixture.

In connection with these 345 cases of cholera, 2,156 contacts in all received the

mixture as a prophylactic—almost all contacts accepting the mixture, whether the cases concerned were being treated by the essential oils mixture or not,—and amongst this number not one case of cholera developed, though, as we have seen above, not less than 132 cases were normally to be expected.

By way of illustration it may be mentioned that in no instance where the mixture was administered as a prophylactic did a *second* case of cholera occur during the year in any house in the Mining Settlement. This it may be added is wholly contrary to the experience of former years when,—through disregard of the advice of the Board's staff on the necessity of taking due precautions for the disinfection of hands and excreta, particularly of the former,—one if not more of the inmates of the same house often contracted the disease from nursing—whole families in some instances thus being blotted out.

Two doses of the mixture were given daily to contacts exposed to massive infection from actually nursing, all other contacts being protected by one dose daily while the risk of infection lasted.

As regards the treatment of the 345 cases reported, 78 or those who were not being attended by private practitioners were treated with the essential oils mixture, amongst whom 16 deaths occurred giving a case mortality rate of 20.5 per cent.

217 cases were treated by private practitioners with "cholera mixtures" and other forms of treatment amongst whom 119 deaths occurred, giving a case mortality rate of 54.9 per cent, while 50 cases were untreated, amongst whom 48 deaths occurred, giving a case mortality rate of 96 per cent.

From the high mortality rate—96 per cent—in those untreated, it may reasonably be assumed that the type of the disease in those treated with the essential oils mixture was of not less than average virulence.

Further analysis of the 78 cases treated by the essential oils mixture shows that of these, 60 cases were not collapsed before treatment was commenced, with an average duration of illness before treatment of 7 hours, of which cases 3 died giving a case mortality rate of 5 per cent. The remaining 18 cases were collapsed before treatment was commenced, with an average duration of illness before treatment of 12 hours, of which cases 13 died, giving a case mortality rate of 72 per cent. From this it is evident that the mixture if given within the first seven or eight hours of the onset of the disease or before collapse sets in is capable of saving not less than 95 per cent of lives. As time progresses however and collapse supervenes, the value of the mixture falls practically to zero since no remedy of this kind can supply the place of the fluid lost. In such cases saline injections



naturally suggest themselves, but that these injections have a very limited sphere of usefulness is shewn by the results of the treatment of cholera in the army and jails of India—as given in the Returns of the Director of Public Health with the Government of India for the decennium 1911-21, during which period such injections were the routine treatment for the disease (Walton, *Trop Dis Bull*, Vol 18, No 5, p 409) 2,153 cases were treated during this period with 1,060 deaths, giving a case mortality rate of practically 50 per cent, as compared with 1,990 cases not so treated, accompanied by 1,191 deaths, giving a case mortality rate of 60 per cent, during the previous decennium

The great value then of the essential oils mixture in the treatment of cholera is, that up to the point of collapse which does not ordinarily occur for a considerable number of hours, and in the cases under review did not take place until after an average duration of illness of 7 hours, the mixture is capable of saving 95 per cent of lives, and thus too in field work under conditions most unfavourable to recovery

The mixture may, therefore, be regarded as bearing the same relation to saline injections for the saving of life in cholera which a life-line does to artificial respiration in drowning

So certain indeed has experience proved the action of the essential oils mixture to be if given in proper time, that in the reports sent in by the outdoor staff of cases treated with the mixture, I now merely look to see whether or not the patient was collapsed before treatment was commenced, knowing that if not, he will almost certainly have recovered, and this is found to be consistently the case

The mixture in this respect closely resembles anti-diphtheritic serum which, although rightly regarded as a specific for diphtheria, is practically useless unless administered sufficiently early in the disease

The great desideratum in cholera is to be able to stop at once the characteristic loss of fluid. Hitherto we have possessed no assured means of doing so and have had to stand helplessly by while the patient practically bled to death, hoping at the best to be able subsequently to replace with more or less success the fluid lost. Such a condition of affairs is now over, for by means of the essential oils mixture we are able at once to stop the loss of fluid and to restore the patient to normal in almost 100 per cent of cases

It should be pointed out that in some cases two or three doses of the mixture will be found sufficient to stop all vomiting and purging, but although this is so, experience in the Mining Settlement has shewn that the mixture

should not be discontinued at this point, not less than eight doses being apparently necessary in every case if recovery is to be made certain of. From this it would appear that the mixture, in addition to its capacity to stop the loss of fluid, possesses antitoxic and stimulating properties of the highest order

The exceptional value of the essential oils mixture for dealing with outbreaks of cholera in general, but particularly amongst collections of coolies, or in villages remote from ordinary medical aid will at once be apparent, since containing as it does no opiates or other dangerous drugs, it may safely be placed in the hands of any intelligent coolie-sardar or village headman who can administer it according to directions either to prevent or to abort the disease as circumstances demand

## A DAY IN THE SHIKARPUR EYE CLINIC

By W A FISHER, M.D., F.A.C.S.,

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It seems strange that in this wonderful clinic, the cataract operations are performed, not by a surgeon confining himself to ophthalmic surgery, but by one who does general surgery as well. The clinic is unique, in that it is only ten years old and is open just six weeks each year from January 1st to February 15th. The clinic is financed by Rai Bahadur Kishendass Premchand, a Hindu banker and is operated by the Quetta Mission, one of the Missions of the Church of England, and has for its operating surgeon, Dr H T Holland, a British subject

*Staff*—The staff of this wonderful clinic is astonishingly small, consisting of two English nurses, three doctors, one sub-assistant surgeon, three Indian non-medical assistants, four non-medical Indians to assist in the dressing of the cases and enough coolies to carry the operated on patients from the operating room to the ward

The work began in Shikarpur in 1911 as the result of a visit by Dr Holland of the Quetta Mission, two hundred miles distant from Shikarpur, when he operated upon two hundred blind Indian patients. The results were so gratifying that an Indian banker erected a hospital for the benefit of the poor and pays the expenses of maintaining it, whilst the Quetta Medical Mission makes a pilgrimage to Shikarpur each year and furnishes the surgeon and nurses to carry on, free of charge. The growth of the clinic is sufficient evidence of the satisfaction given to the people

It was my good fortune to enter into this work in January 1923 and an account of one day's work, January 22nd, 1923, may be interesting to ophthalmic and general surgeons

On this date three hundred and seventy-seven patients applied for relief, of which two hundred and sixty-seven were eye cases, and one hundred

and fifty-two operations were performed as follows —

Cataracts	100
Iridectomies	13
Intra-orbital cyan	1
Sub-conj injections	2
Peritomy	2
Pterygium	6
Symblepharon	1
Lachrymal sac	1
Trachoma	4
Trichiasis' plastic	7
Dermoid cyst	1
Meiboman cyst	1
Tenotomy, strabismus	1
Tumor of scalp	1
Piles	6
Fistula in ano	1
Calculus, litholapaxy	2
Hernia	1
Hare lip	1
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*Visiting Surgeons*—There were two English surgeons, one a missionary, the other in the English Army Service, and one American surgeon beside myself, who assisted in the work. Dr Holland personally passed on all the cases because he understands their language, sending the general surgical and minor eye cases to the general surgical room and the cataracts and iridectomies to the cataract room.

In the general surgical room is a plain operating table and a home-made sterilization outfit. In the cataract operating room are two operating tables, a home-made sterilizer, and two very competent Indian assistants, who are however, non-medical men. After two hours of preliminary work and assigning patients by Dr Holland, the general surgical work began in one room and the cataract work in the other, one hour was consumed for tiffin, and the clinic was finished at 5-30 p.m. It was my good fortune to operate on all the cataracts, which may seem to be the major part of the day's work, but such was not the case, because everybody was busy the entire day.

The hospital is closed on Sunday which makes Monday a very busy day, and January 22nd was one of the busy Mondays. It would seem impossible that so much could be done in a single day, but much more was done than is so far stated. The dressing of previous operations must be cared for before the new day's work is started, and in this busy time there were about two hundred patients to be cared for that had previously been operated upon.

This colossal work should have more publicity among medical men than it has had, for the good of mankind, but no one who has seen the work can criticize Dr Holland for not writing more. In the first place he is a very modest worker, going along doing his duty as he sees it, and secondly, who can say that he has the time? He has reported the season's work at different times, in one season having 113 cataract operations in a single day, but they were not all operated on by

one surgeon. The intracapsular operation by the Smith method is his routine practice, and he operates whether the cataract is mature, immature, or hypermature. However, on a few selected complicated cases (probably less than five per cent), he does the capsulotomy operation. When the patients are sent home, he feels that all has been done for them that is possible, and they will not return for an after-cataract operation.

*After-treatment*—The after-treatment is quite simple, because post-operative complications are rare. The first dressing is usually made on the fifth day and more than half the patients are sent home before the ninth day.

The surgical results on the one hundred cataract operations performed on January 22nd, were as follows —

- 93 good results
- 2 hæmorrhage of the choroid, both having burst capsules and were plus tension eyes
- 2 infections
- 2 hyalitis
- 1 gaping wound
- 1 lens lost in the vitreous (The eye was bandaged, and three days later the lens was removed successfully)

Dr Holland has promised a complete report of the one hundred cataract operations in the near future, including a detailed account of all complications and surgical results, as well as of the general surgical operations.

Some ophthalmic surgeons may criticize what they call imperfect records, but no one would expect better if they could see the volume of work done, and the inadequate facilities for doing it. The surgical results only are recorded, and no attempt is made to refract the patients or get their exact vision. Nor would it be possible, because they are dismissed as soon as the eyes are quiet.

The lens is out as well as the capsule, and they are told to get glasses in about a month. Most of our own patients who live long distances away are given the same instructions after a capsulotomy operation, or after a successful needling, if such is necessary.

The one satisfactory point, Dr Holland claims, is that the eyes have better vision than if the capsulotomy operation had been performed. First, because very few have post-operative inflammation, and secondly, they are practically free from secondary cataract.

Dr Holland began by the capsulotomy method and his reason for changing to the intracapsular was because the vision was better by the intracapsular method.

Rai Bahadur Kishendass Premchand, the Hindu banker, who is financing this work is carrying out one of the greatest personal charities in India, and he is delighted with the number of patients brought back from blindness to usefulness, and seems pleased to pay the bills. Dr Holland and the Quetta Mission are happy in the humane work which they are doing. Any one who visits Shikarpur would say that all that is possible is being done for these unfortunate

people, and could only wish there were more missionaries surrounding themselves with high class surgical skill as they have in Dr Holland, and more charitable men like Rai Bahadur Kishendass Prenchand who finances the work. A charitable institution such as the Quetta Mission should have a very substantial financial backing to carry on this colossal work, and to extend the work to the other parts of India.

### OBSERVATIONS ON ŒDEMA \*

By W BURRIDGE, D.M., M.A.

*The Physiological Laboratory Lucknow*

THE purport of the present communication is to present evidence that the condition termed œdema may be due to at least two causes, each with its own effects. The experiments on these points have been performed on the perfused hind limbs of frogs. A cannula was inserted into the abdominal aorta and the fluid supply to the one limb cut off by ligaturing its artery, while the supply to the other limb was free. When next after perfusing the limb with Ringer's solution it was observed that the perfused limb had a distinctly swollen appearance as compared with its fellow, such a swelling was considered to be œdema. Granting this swollen state to correspond with that state known clinically as œdema, the experiments showed that at least two distinct states pass under that name. For reasons which appear later we would call these two states the œdema of pressure and the œdema of function respectively.

The œdema of pressure was readily produced by a too-high perfusion pressure, a greatly swollen leg being developed thereby in some twenty or thirty minutes. The word developed is used in this connection because the appearance of the œdema in no manner corresponded with that which should follow the turning of a tap and the filling of a bag with water. The development of this œdema was such as one would expect if, between the reservoir of fluid and that fluid responsible for the œdematous condition, there was a filtering medium giving a "lag" as well as a barrier between filtrate and filtrand. The effect of the high pressure seemed simply that of increasing the rate of a possible normal filtration.

A limb swollen with fluid in this manner was not found to suffer any diminution of functional capacity.

The second type of œdema I would term the œdema of function because it is typically seen after muscle has been fatigued. In this connection are pertinent the two old observations of physiology that a fatigued muscle recovers if it be merely washed through with a saline fluid, and that it has a higher osmotic pressure than normal, conferring on it a capacity to take up water. The existence of this higher osmotic pressure has

been denied by Fischer who ascribes the uptake of water to imbibition of water by acid hydrophil colloids, but such differences of opinion concerning the cause of the uptake of water do not influence the additional fact to be added that, as the muscle takes up the water, there follows a corresponding loss of functional capacity. The greater the œdema, the less able is the muscle to contract. A further and possibly more important point is that the nerve-ending is much more sensitive to the loss of function associated with this kind of œdema, than is the nerve or muscle, thus reminding one of another old experiment showing that nerve-endings are more readily fatigued than either nerve or muscle. I found that the slightest degree of œdema due to this second cause was associated with severance of the functional connection between the nerve and its muscle. Incidentally also fatigue was far from being the sole method of producing this type of œdema,—a too-acid perfusing solution being also highly efficient.

Thus for a limb to become swollen through addition of water we can from these experiments assign two causes, each followed by its proper effects. Comparing our functional unit with a boat, its functional capacity is no more affected by the extra water in the first case than is the capacity of the boat to float when moored near the bank or in mid-stream respectively. But the capacity of the boat to float is diminished correspondingly with the presence of water inside it irrespective of its position.

Assuming next that an œdema of the second type exists in human pathological conditions, one of the effects would be diagnosed as peripheral neuritis, a point of possible importance in connection with certain tropical diseases, e.g., beriberi. Such nerve-ending block might possibly also be the starting point of a degeneration atrophy somewhat as section of a motor nerve can be responsible for changes taking place in anterior horn cells. Finally we have to note that this œdema of function with its marked influence on synaptic passage could exert more profound effects and give rise to even greater confusion between cause and effect should it occur in the central nervous system.

### THE USE OF PETROL FOR CLEANSING THE SKIN PRIOR TO OPERATING

By Major F J W PORTER, D.S.O. R.A.M.C. (Retd.),  
*Bombay*

I SHOULD like to call attention to the use of petrol as an efficient substitute for ether in cleansing the skin for operation purposes. I have used this substance for over 12 years with entirely satisfactory results. Whilst at home recently, I visited my old hospital (the London) and found that ether soap was the material which is being used for this purpose and I have no doubt that it is similarly used in most of the hospitals all over the country.

\* Being a paper read at the Medical Research Section of the Indian Science Congress, at Bangalore, 1924.

I believe that such is the case in India, for I have not yet found a surgeon who had ever used petrol for this purpose

In the larger hospitals ether is of course available, but in these hard times economy should be the order of the day

In mofussil practice ether may not be available, but petrol is everywhere obtainable

My surgical practice is fairly extensive and my results are quite as good as they were in the days when I used ether soap

I take absorbent cotton wool as it comes from the manufacturer, wet it with petrol and scrub the skin with successive swabs until they come off clean, I then paint the skin with tincture of iodine. This is done the night before and repeated on the operating table. I find that petrol is quite as efficient as ether in the extraction of dirt and fat from the skin, and after all, this is the function of both substances, viz., to allow the iodine to penetrate

If this method be adopted a large annual saving will be effected. Methylated spirit in India is made by adding caoutchoucine  $\frac{1}{2}$  oz and pyridine  $\frac{1}{2}$  oz to each 100 gallons of rectified spirit and tincture of iodine can be made from it without fumes of iodine escaping

The amount of iodine used in large hospitals annually must be very considerable

#### NOTES ON THE TREATMENT OF ORIENTAL SORE BY INTRAVENOUS INJECTIONS OF ANTIMONY TARTRATE

By D C MAZUMDAR, M.B.,

CAPTAIN, I M S (Ternpy)

The sore generally starts as a papule which gradually becomes covered with scales and begins to break down in about a fortnight. The sore is generally about a half to one inch in diameter, it is single or multiple, it has an undermined and ragged edge not fixed to the underlying tissues, it is fairly deep, is covered with a dirty looking necrotic slough or scab, and though not painful it is tender. The surrounding skin gets discoloured, infiltrated, inflamed and markedly cedematous, there is some lymphangitis and sometimes phlebitis. There may be a general malaise and slight evening rise of temperature owing to secondary infection

The sores seen by me were most obstinate and refractory to the most energetic local treatment and ordinarily took about six months to heal under local treatment, during this time the sore may break down four or five times. The progress is rather illusive, apparently healthy granulations form in the centre, instead of from the edge, even a well formed cicatrix may break down and produce a condition worse than the original one. The use of strong antiseptics is followed by burrowing and infiltration of the lesion. The sore

has also a tendency to burrow under the adjoining skin to a certain distance without affecting the surface

Various antiseptics were given a trial, a batch of cases was put on to eusol dressings, others on to mercury perchloride, zinc sulphate and copper sulphate lotions, B I P P, pot permanganas, antimony (2 per cent with soda bicarb), methylene blue ointments, and various compresses and saline dressings were tried. Ointments were useless as long as there was a discharge. The results of scraping and excision were also equally unsatisfactory, as infiltration was fairly extensive and subsequent breakdown was very common. Strong saline (5 per cent to 10 per cent) followed by normal saline was found to be the most efficacious local remedy. The patients on admission are dressed with strong saline. This tends to clear away the slough in about 7 to 10 days and brings about a fine granulating surface which bleeds readily. At this stage the strong saline is replaced by normal saline

A few of the cases showed *Leishmania tropica* parasites. The presence of these, the intractable nature of the sores and the obstinacy under the most energetic local treatment, suggested a course of antimony injections

My patients were generally healthy and strong. I started with 2 c.c. of a 2 per cent solution of antimony tartrate and gradually went up to 6 or 7 c.c. Very few of the cases required larger doses. Injections were given on alternate days. Some patients showed intolerance with higher doses, but very few with 3 c.c. The signs of intolerance were slight cough, nausea, even paroxysms of coughing and vomiting, pain in the joints, fever and diarrhoea, but they were not severe enough to cause any anxiety. It is possible that the patients, being otherwise healthy, stood the injections exceptionally well. Certain cases however, may be susceptible to antimony injections. It is therefore, imperative that the first dose should not be more than 2 c.c. Tolerance to the drug is soon established under gradually regulated doses. More than 5 c.c. doses are given only in the most obdurate cases

Combined treatment with antimony intravenously and saline locally was found most successful in about 300 cases treated by me in the Indian General Hospital in Dera Ismail Khan between June 1920 and July 1921. The stay in hospital for the course of treatment was between 4 to 6 weeks. After 4 or 5 injections the sores invariably showed signs of healing, with each injection the discharge used to get less till the sore ultimately dried up. Strong saline locally was a powerful adjuvant to the injections

The antimony solution should be always prepared fresh and sterilised for half an hour in the autoclave. Patients should have absolute rest on the day of injection and should be kept on milk diet, though most of my cases did well on ordinary diet

# FOREIGN BODIES IN THE EAR AND NOSE

By F D BANA, MB, MRCS, DPH, DTM & H (London),

*Junior Honorary Rural Surgeon, J J Hospital, Bombay*

FOREIGN bodies are frequently found in the ears and nasal cavities of children and occasionally of adults in Bombay. In the former, the foreign body is usually a small round, oblong or ovate body pushed into these cavities by the child itself or some other child while playing. Attempts at removal by the fellow player or parents invariably lead to its getting further into the cavity. In adults, foreign bodies occur as the result of some one putting them in deliberately as in the case referred to below of a syce (aged 25) with a cockroach in his ear, or of insects finding their way into the cavity when the person is asleep or even at work as in case No 1.

The commonest foreign bodies found in children's ears and noses are the following —

Beads of various kinds, perforated and unperforated, either of glass, enamel or artificial pearls, seeds such as jequirity, pea, ground-nut, soap-nut, and—most frequently in Bombay—tamarind seeds, grains such as rice, wheat and gram, fruit stones like the lemon, berry and the date, pebbles or small stones either smooth, rough, oval or oblong, ends of country cigarettes, bits of lead pencil or slate pencil or pen. In the following cases foreign bodies were found mostly in children, except cases Nos 1, 2, 6 and 10, where a wasp, peas, a cockroach, and a stone were found in adults respectively. Pieces of rubber, straw, betel-nut, match sticks and paper are occasionally met with.

As a rule the children are brought up for examination within 24 hours by their parents, who get alarmed when they hear of a foreign body being put in these passages by their own children or others. Occasionally they are brought after a considerable time as in case No 4, brought in 2 months after the end of a country cigarette had been pushed up the nose, and case No 12 of a piece of betel-nut put in a month before, sometimes a purulent discharge sets in and the child is brought in for the cure of the discharge.

*Methods of removal*—The way to remove a foreign body from the ear and nose is either to wash it out with a syringe or to use a scoop or malleable probe. A pair of forceps usually drives the body further inwards and is hardly of any use. If the body is small and is lying loose within the ear, it can be easily syringed out. From the nose it may be removed with a scoop or a whiff of snuff will help to sneeze it out. If it be large and impacted and previous efforts to remove it have been unsuccessful, a malleable copper probe with a slightly bent bulbous end is the best instrument to use. If big, no attempt should be made at removal by forceps, as this drives it inwards. The probe is passed either above or below the foreign body and traction made slowly so that the foreign body moves out with the probe. It is very rarely that the probe can hook

it out. In a narrow canal like the ear it is invariably the traction of the probe that moves the body forward. It has to be manoeuvred out carefully. In children, especially those under five or six, it is very difficult at times to handle a foreign body as they are easily frightened by instruments and manipulations. It is best in such cases to send away the parents or relations and hold the child firmly in an assistant's grasp. As many as five persons may have to hold the child and then all the obstructive and defensive forces of the child's musculature have to be encountered. He jerks his leg, puts his hand out, tries to bite, moves the head, holds up his shoulder or his neck. It is in fact a struggle for escape as the child thinks he is going to be injured and the patience of the surgeon and his assistants is sorely put to trial. On persevering with a steady hand, good light and a tactful assistant a foreign body can easily be removed. If the child is very refractory and the struggle is prolonged, and if good light and capable assistance are not available it is best to give chloroform to remove the foreign body.

The following are a few interesting cases —

(1) A European, aged about 50 working in the harbour at the searchlights during the war one night whilst on duty was attacked by a swarm of wasps. They stung him on the face, neck and hands. A few found their way into his ears and stung him there. As a result he was in great agony, came away from work and was sent to the European General Hospital. Some wasps were removed from his ears and he left the hospital in four days but one of his ears was still very bad and caused him great annoyance and pain. He then shewed it to the surgeon there who syringed out his ears but nothing came away. As he still complained of dull pain and noises in his ear, he was sent to me. On examination with the speculum nothing could be seen. On still minuter examination a hair-like projection was seen against the membrane, which, on being pulled out, turned out to be one of the legs of the insect, which was subsequently removed. The dead insect lay at the bottom of the meatus in the recess formed between the lower wall of the meatus and the membrane, which may be called the "infra-membranic recess" and where nothing can be seen. This fossa is not prominent in all but is well formed in some people, and wax or any foreign body sticking there is very difficult to remove. The man very nearly got into trouble for reporting sick as the insect could not be seen on ordinary examination. Only when the insect was removed was the irritation of the drum relieved and on his shewing it to his superior officers he realised that the man was not malingering.

(2) Mahomedan boy, aged 15. Peas in both ears put in 24 hours before, removed by probe after crushing with forceps.

(3) Jewish boy, aged 5. Tamarind seed in left nostril eight days duration. Removed with probe.

(4) Girl, aged 4, with purulent discharge from the right nostril, duration two months. Foreign body suspected. End of country cigarette removed with probe.

(5) Girl, aged 2. Small artificial pearl in right ear put in four days before. Removed easily by forceps.

(6) Cockroach in adult's ear. A syce (aged 25) complained of having felt a cockroach crawl into his right ear when he was sleeping in a stable at 12 midnight but could not remove it. Manipulations killed the insect but it still lay in the ear. Size  $\frac{3}{4} \times \frac{1}{2} \times \frac{1}{4}$  in. Removed with the forceps in bits.

(7) Goanese boy, aged 2. Date stone one inch long by  $\frac{1}{2}$  inch broad put in the left nostril 24 hours before. Removed with difficulty with probe.

(8) Girl, aged 2. Tamarind seed  $\frac{1}{2}$  in square in left nostril. Cotyledons removed the day before. Skin

softened and removed in bits next day Violent struggling

(9) Girl, aged 3 Jequirity seed in the ear, duration 14 days Removed with probe Very trying, half an hour under chloroform

(10) Labourer, aged 16, complained of a stone having been put in his right ear when asleep by a child two days before Shape of stone ovoid and smooth, size  $4 \times 6$  mm The stone having slipped into the ear with the bigger diameter parallel to the auditory canal was further pushed beyond the isthmus by manipulations for removing it Once past the isthmus it turned on its axis and lay vertically at the bottom of the external meatus In this position it could not be removed An incision was made on the floor of the canal after cocaineizing, and the stone removed with great difficulty with a probe Attempts at removal of such smooth stones by the patient or his friends always lead to the stone being driven further into the cavity and getting firmly impacted in the canal, rendering subsequent removal very difficult indeed

(11) Female child, aged 4 Wheat grain removed from the right ear The grain had been impinging for the previous four days on the drum, stuck in the way at the infra-membranic recess, and caused great irritation of the membrane

(12) Fisherwoman's girl, aged 2, with discharge from the right nostril A pyramidal piece of betel-nut of size  $3 \times 4 \times 5$  mm removed with probe Mother then admitted its having been there for one month

(13) Girl, aged 5 Piece of crumpled brown paper at the bottom of the right auditory canal Removed Duration 24 hours

(14) A square piece of soda water ring rubber pushed into the ear of a lad, aged 12, by his playmates, and stuck fast in the wax for the last four days Attempts at removal by practitioners rendered the boy so neurotic that he would not allow any handling Under chloroform anæsthesia it was removed with difficulty

(15) A large blue perforated glass bead removed from the right nostril of a Hindu girl, aged 6, lodged between the septum and the inferior turbinate bone 24 hours before Removed with a probe with difficulty amidst struggling

(16) Small hollow blue glass bead removed from right ear of a Hindu girl, aged 2, bead inserted by the child herself five days before whilst playing Child very refractory

(17) A big black soap-nut seed removed from the right nostril of a Hindu girl, aged 3 Put in the same morning

(18) A Mahomedan boy, aged 5, put into his right ear a small golden coloured hollow glass bead two hours before Removed easily by probe

(19) Hindu girl, aged 4, brought by her father for removal of a foreign body from the right nostril A very big tamarind seed, the biggest I have yet removed Size  $\frac{1}{2}$  inch square by  $\frac{1}{3}$  inch broad and still coated with the brown tamarind pulp, removed with greatest difficulty Several probes were rendered useless as the seed was swollen and lay very firmly impacted between the septum and the right inferior turbinate bone The only thing that was of use was a Eustachian catheter and even then it got so badly bent as not to be recognizable after the removal

(20) Hindu girl, aged 3, brought in by a police sepoy for removal of a ground-nut seed from her left nostril Easily removed with a probe Four days duration

(21) Indian Christian girl, aged 3 Tamarind seed from one nostril and cotton wool plug from the other removed Four days duration

Thus of 21 cases reported here excluding four cases in adults, where respectively a wasp, a cockroach, peas and a stone were removed from men aged 50, 25, 15 and 16,—16 cases were of children of whom 4 were boys between 2 and 5 and 13 girls between 2—6 years of age This shows that girls at this age are nearly three times as mischievous as boys and are three times as fond of putting small bright objects like artificial pearls, beads,

seeds, etc., up their noses or ears than are boys of the same age

### Summary of Cases

Case No	Foreign Body	Where found	Sex	Age	Removed after
1	Wasp	Ear	Man	50	4 days
2	Peas	Ears	Boy	15	2 hours
3	Tamarind Seed	Nose	Boy	5	8 days
4	Cigarette	Nose	Girl	4	2 months,
5	Artificial Pearl	Ear	Girl	2	4 days
6	Cockroach	Ear	Man	25	10 hours
7	Date Stone	Nose	Boy	2	24 hours
8	Tamarind Seed	Nose	Girl	2	24 hours
9	Jequirity Seed	Ear	Girl	3	14 days
10	Stone	Ear	Boy	16	2 days
11	Wheat Grain	Ear	Girl	4	4 days
12	Betel-nut	Nose	Girl	2	One month
13	Paper	Ear	Girl	5	24 hours
14	Rubber	Ear	Boy	1	4 days
15	Blue Glass Bead	Nose	Girl	6	24 hours
16	Glass Bead (Hollow)	Ear	Girl	2	5 days
17	Black Soap-nut Seed	Nose	Girl	3	6 hours
18	Hollow Glass Bead	Ear	Boy	5	24 hours
19	Big Tamarind Seed	Nose	Girl	4	24 hours
20	Ground-nut Seed	Nose	Girl	3	4 days
21	Tamarind Seed left Nostril, Cotton Wool Plug Right Nostril	Nose	Girl	3	4 days

I have to thank Lieutenant-Colonel Tucker, I M S, and Lieutenant-Colonel R Markham Carter, I M S, for permission to report some of the above cases seen at the hospital

## A Mirror of Hospital Practice.

### A CASE OF HYPERSENSITIVENESS TO HORSE SERUM WITH SUCCESSFUL TREATMENT BY DE-SENSITIZATION

By Dr A R J DOUGLAS, M D (Lond), F R C S (Eng),

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As the number of published allergic cases in India is small and as the literature relating to specific hypersensitiveness is not easily available to many practitioners, the following case may be of sufficient interest to publish, more especially as it proved favourable to treatment —

The patient, a young married woman, has suffered from catarrhal symptoms and asthma at intervals for a number of years She gave a history of sensitiveness to horses and cats She also stated that for the last 10 years she had not been able to ride, as about 10 minutes after getting on horseback she started catarrhal symptoms culminating rapidly in an acute attack of asthma

She was tested in Calcutta with several protein extracts and reacted to the cutaneous test with horse dandruff extract and *hulsa* broth As she was returning to Burma the consultant who

carried out the tests gave her a statement of his results and advised de-sensitization to be carried out with horse serum or dandruff in Rangoon. The case was accordingly transferred to me and horse dandruff extract not being available, it was decided to try and de-sensitize her with horse serum.

An intradermal injection of about 0.01 cc of horse serum was first made into the flexor surface of the forearm according to Cooke's method, using a tuberculin syringe, the skin having been previously cleansed with alcohol, and produced a small elevation about 2 to 3 mm in diameter. Almost at once a reaction was seen which reached its maximum in less than 5 minutes. A wheal developed between 1 and 2 cm in diameter with a considerable area of erythema but no constitutional signs. The injections were continued as follows —

Date	Time	Amount of horse serum c c	Method of Administration	Result
8 1 24	9 35 a m	0 01	Subcutaneously	No reaction
	9 55 a m	0 05	Do	Do
	10 15 a m	0 1	Do	Do
	10 30 a m	0 2	Do	Do
	10 45 a m	0 4	Do	Do
	11 00 a m	0 8	Do	Do
	11 20 a m	1 0	Do	Do
	2 15 p m	0 1	Intravenously	Do
	2 40 p m	0 2	Do	Do
	3 00 p m	0 5	Do	Mild reaction, itching of eyes, increased secretion eyes and nose
	3 20 p m	1 0	Do	Mild reaction itching of eyes increased secretion eyes and nose, also swelling of left side of nose and slight asthmatic signs
	3 40 p m	2 0	Do	Same symptoms
	4 00 p m	5 0	Do	Swelling of nose and catarrhal symptoms subsiding
	4 20 p m	15 0	Do	Almost immediate swelling of eyelids (particularly the right), irritation of throat and marked nasal catarrh. 10 cc of Adrenalin 1 in 1,000 given. In about 10 minutes symptoms had subsided but right eye still swollen, injections stopped.

On January 12th, four days afterwards, the patient tried riding. She says that after half an hour she had a slight reaction, her eyes itched and she sneezed twice, she stopped riding and these symptoms passed off in about half an hour. She was pleased with this experiment as before the injections, after about 15 minutes riding, she would have had streaming eyes and finally an attack of asthma.

The patient says that before she went riding on Saturday, January 12th, she had some swelling in the axillæ. On January 13th, she fomented these as they were still troubling her.

January 14th. She woke up with both eyes swollen, aching in the body and limbs, with fever and pains in her joints.

January 15th. Large white wheals with red margins appeared, which were very irritable. These appeared in crops at intervals of about 1½ hours and extended nearly all over the body and limbs, she had also aches and pains and fever. This urticarial rash lasted about 30 hours and disappeared about 2 a m on the 16th. The symptoms were similar to those which occur in patients not specially sensitive about a week after the injection of a considerable dose of serum.

The aching in the limbs and joints lasted for some days more.

On January 22nd the patient stated she had ridden that day and the day before for about an hour without any reaction or discomfort of any kind.

On February 11th the patient informed me that her asthma has now gone and she is now riding regularly without experiencing any trouble or discomfort.

The following conditions for treatment are taken from the American authorities. Use horse serum 1 in 10 dilution for the intradermal (Cooke) injection, 0.1 cc or less, preferably 0.05 cc, of this dilution. A control test should be made at the same time with normal saline or 1 in 10 dilution of rabbit or sheep serum. Wait half an hour before deciding that the test is negative.

The intradermal method of testing has been proved to be a more reliable one than the cutaneous.

A positive reaction interpretation may be taken if there is definite enlargement of the injection wheal with a surrounding zone of erythema, and if the control has not reacted.

If the patient has had asthma great caution is necessary. The first dose subcutaneously should not be larger than 0.025 cc. This dose is doubled every half an hour until 1 cc is given. Then give 0.1 cc intravenously and double the dose every 20 minutes. In this particular case the maximum dose given was 15 cc intravenously.

Those who desire further information with regard to this subject and as to the details of technique are recommended to read the article by G. M. Mackenzie in the *Journal of the Amer Med Assocn*, Vol 76, June 1921, also a series



of articles by various authors entitled "Studies in specific hypersensitiveness" in the *Journal of Immunology*, Vol VII, 1922

CLINICAL NOTES ON SOME INTERESTING CASES OF DIFFICULT LABOUR

By A G TRESIDDER, M D, B S (London),  
MAJOR, I M S,  
Surgeon to His Excellency the Governor of Bombay

PART I

THE following cases of dystocia, although none of them can be considered very uncommon in modern obstetrical practice, may be of interest to readers of the *Indian Medical Gazette*

Case I *Sluggish Uterus (Primary Uterine Inertia), due partly to Inherent Weakness of the Uterine Muscle and partly to Premature Rupture of the Membranes*

Mrs C, a somewhat stout but otherwise healthy Anglo-Indian, aged 30, consulted me during the last month of her tenth pregnancy regarding the possibility of her being delivered of a live child. Her obstetrical history was as follows —

Her first confinement took place thirteen years previously. The labour was a normal one lasting fifteen hours, and the child, the only one born alive—was a healthy full-time girl.

The second child, also full-time, was still-born after an apparently easy labour lasting six hours, the patient was positive that she felt movements up to the day preceding her delivery.

With her third child she also went to term, but the labour was complicated by placenta prævia and the child was born dead.

In the fourth labour, which the patient stated lasted for eight hours the child presented by the breech and was born dead, movements were felt up to the commencement of labour.

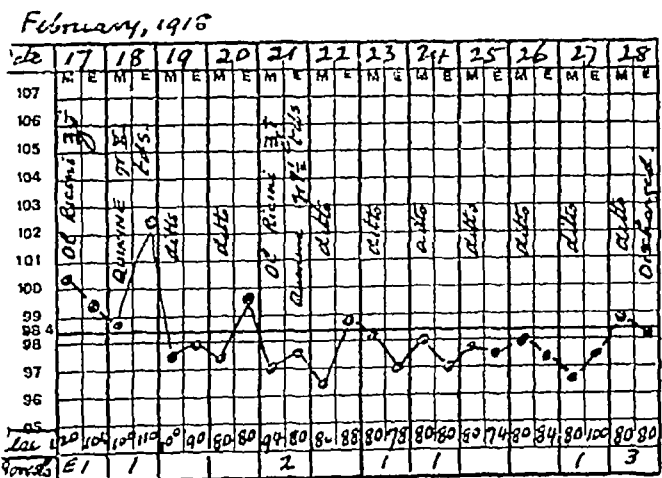
The fifth and sixth labours were normal except that the children were born dead, although according to the patient she felt vigorous movements up to the last day of her pregnancy.

At the end of her seventh pregnancy labour commenced with strong pains. After about six hours the pains gradually became weaker and then ceased altogether, on the fourth morning after the commencement of the pains the child's movements were no longer felt by the patient and she now experienced the sensation of "a heavy weight" in the abdomen. Three days later the labour pains commenced again and after lasting a few hours a dead child was born. The patient's medical attendant informed her that her baby had been dead for a few days before its birth. The eighth and ninth pregnancies ended in abortion at the end of the second and third months respectively.

The history of the repeated still births in this case might be taken as indicative of infection with

syphilis except that the patient insisted that foetal movements were strong and active up to the hour of her labour, which in each case resulted in the birth of a full-time child. Had syphilis been the cause of the still-births one would have expected a history of premature labours and of foetal deaths some time before the onset of labour. Evidence against the likelihood of infection with syphilis was afforded firstly by the fact that the patient's first and only living child (whom I had the opportunity of examining) was a perfectly healthy and well-developed girl showing no signs whatever of congenital syphilis, and, secondly, the patient's Wassermann reaction was completely negative. Syphilis, however, could not be positively excluded as the patient might have been infected after her first delivery, and it is known that the Wassermann reaction is often negative during pregnancy and for some time after delivery in women who are the subjects of syphilis.

I was first consulted on February 13th, 1918, and at midday on February 17th she was admitted in labour to the Maternity Department of the Sassoon Hospital, Poona. Labour started with



premature rupture of the membranes and, as is usual when this accident happens it lasted a long time,—to be exact 37½ hours.

The patient stated that the waters had broken three hours previous to her admission to hospital and shortly afterwards weak labour pains commenced. There was no definite cause for the premature rupture of the membranes.

Abdominal examination showed the child to be lying in the second vertex position, the head was not fixed and the foetal heart sounds were good and of normal rate.

P V the os admitted one finger, the cervix was not taken up and the liquor amni was escaping.

The patient's temperature was 100.2° F, and her pulse rate 120 per minute, a blood film showed the presence of benign tertian gametocytes, the fever and high pulse rate were therefore attributed to malaria. (Treatment with



quinine was commenced on the day after admission, i.e., as soon as it was definitely known that the patient was suffering from malaria.)

At 8 p.m. on the same day, i.e., eleven hours after the membranes had ruptured—the pains were still very feeble, the head was still movable above the brim and the os uteri barely admitted two fingers.

I considered that such slow progress was very likely to end in uterine exhaustion, and that unless some assistance was given the chances were that the present labour would be a replica of the patient's seventh labour with once more disastrous results for the child. C.E. was therefore administered, the cervix dilated and Champetier de Ribe's bag introduced.

The bag was not expelled until 7.30 a.m. the following morning. The presence of the bag had very little, if any, effect on the strength of the pains, in fact the only difference noted after the expulsion of the bag was that the cervix was dilated. The pains remained much the same, the foetal head was still movable above the brim, the cervix was not taken up, its dilated rim hanging loosely into the vagina. The cervix had merely been dilated mechanically by the traction of the bag, the feeble uterine contractions taking a very small part in its expulsion.

At 11 a.m. on the 18th the pains having died away, and as the patient was showing signs of exhaustion supervening, chloral hydrate gr. xx was given by the mouth. This had the effect of inducing sleep for about two hours.

At 2 p.m. an intramuscular injection of 1 c.c. pituitrin (Park Davis & Co.) was given and this having no effect on the pains, a similar dose was given at 4 p.m. At 6 p.m. another 0.5 c.c. pituitrin was administered and two hours later, as the head had not advanced and the pains being still weak, another 1 c.c. of pituitrin was injected. This had the effect of inducing strong contractions of the uterus which commenced at 9 p.m., these continued with increasing force up to the birth of the child at 10.25 p.m. on the 18th February. The child was born alive, a healthy full-time male weighing 6½ lbs.

The third stage of labour ended naturally. The patient soon recovered from her malaria and on the 28th February mother and child, both quite well were discharged from hospital.

#### REMARKS

In this labour I think there can be no doubt that the premature rupture of the membranes was responsible, to some extent at any rate, for the weak pains and the prolongation of labour, but I think the history of this labour points rather to a natural weakness of the uterine musculature as the chief factor.

A naturally weak power of contraction of the uterine muscle could be reasonably held to explain

the fact that the presence of de Ribe's bag within the lower uterine segment failed to stimulate the uterus to empty itself, this would also explain the lack of response to such a powerful drug as pituitary extract. It might be held that the pyrexia throughout labour tended to exhaust the patient generally and so indirectly to lessen the strength of the uterine contractions. It is not usual, however, for fever during labour to have such a marked influence on the uterine musculature.

As regards the previous history of this patient, it seems to me that the cause of death of some of the children was an impeded placental circulation resulting from retraction of the uterus after premature rupture of the membranes and loss of the liquor amni. Careful enquiry, however, failed to elicit at what period of labour in her long list of misfortunes the membranes had ruptured, the patient was unable to remember any further details except that in two of these labours the waters burst quite early, whilst in her seventh confinement this happened only a short time before the birth.

#### Case II *Sluggish Uterus Cæsarean Section*

Mrs. L., a Swede, aged 44, was admitted under my care at 11 p.m. on November 20th, 1917. She stated that the waters had ruptured at 7 p.m. the same day, whilst she was straining at stool.

This patient had been married for six years and the following is the history of her previous labours.

Her first labour began with a "show" at 6 p.m. Four hours later she was examined by her doctor, who informed her that every thing was all right. She remembered that she passed a rather restless night and also that there were "no labour pains."

At 4.30 p.m. on the following day her pains were no worse than the backache which she experienced at her periods. A few hours later forceps were applied and a live child was delivered. The birth was followed by much bleeding, probably from a cervical tear, and subsequently for a period of six weeks the patient was extremely ill with puerperal fever. She was also unfortunate enough to lose her child at the age of fourteen months from hydrocephalus.

The second confinement took place in August 1914. She was admitted to hospital at 8 a.m., throughout the day there were no pains and her medical attendant doubted whether she was really in labour. Examination showed that the child was lying "crossways", an attempt was made to perform external version, but this was apparently not successful. Thirty-three hours after the membranes were supposed to have ruptured, it was noticed that there was a meconial discharge from the vagina. The patient described her pains as having been very slight since the morning of the second day. At 7 p.m. the same evening she

was given chloroform and "a bag was used", at 9 o'clock the following morning she was again anaesthetised, the child was turned and delivered dead.

The third confinement took place in 1916. The stages of this delivery were thus described by the patient, who was remarkably clear as to details. She spent the last five weeks of her pregnancy in hospital with the object of being under medical supervision. One night she did not sleep very well, and she had slight pains in her back, on the following morning she was examined, but it was considered that she was not in labour. About 4 days later, there having been only very slight pains in the interval, examination revealed the presence of meconium in the vagina. Again it was a cross-birth, a leg was brought down and a dead child delivered some hours later.

To return to the events of her fourth confinement,—as already stated she was admitted four hours after the bursting of the membranes but she was not seen by me until 10-30 a.m. on the following morning. She had had absolutely no pains during the night, during which time she had been kept lying down with the foot of the bed raised in order to prevent, as far as possible, any further loss of liquor amni. The pulse rate was 66 per minute and her general condition was good. Abdominal palpation showed the child to be lying obliquely with the breech lowermost. I was unable to hear the foetal heart, but during my examination strong foetal movements were felt. There was a discharge of liquor amni, the os admitted one finger and no presenting part could be reached.

The last menstrual period began on March 15th, 1917, ending five days later, and therefore the probable date of delivery would be about December 22nd, 1917, hence labour had commenced just a month too early.

The patient was extremely anxious to have a live child. The exhibition of pituitary extract, at any rate unless the oblique lie could be converted into a vertex or breech presentation and the child maintained in this position, would be dangerous to the mother, the use of a dilating bag followed by internal version and delivery would carry with it the risks and dangers of breech delivery. The patient's age rendered it very likely that her present pregnancy would be her last, and considering the sluggish action of the uterus in her previous confinements as well as the circumstances of the labour which had now commenced, it seemed to me that Caesarean section was the method of delivery most likely to result in the birth of a live child. Whilst all are agreed that it is better not to perform Caesarean section after rupture of the membranes, in this case I think I was justified in not regarding this condition as a definite contra-indication to delivery by the abdominal route, especially in view of the fact that only one vaginal examination had been made and this by myself and with the usual care. There was, however, one factor which one

would have preferred otherwise, viz., that the child was premature.

However, considering all the aspects of the case, it seemed to me that Caesarean section was the method of delivery which should be adopted. This operation was therefore performed and a live child of 6½ lbs weight delivered. Unfortunately, however, there was some difficulty in inducing satisfactory respiration, the child's skin remained of a bluish tinge and despite all efforts it died six hours later. The mother made an uneventful recovery.

In passing, I may mention that several months later this patient consulted me on account of uterine prolapse. Besides the prolapse the genital passage showed undoubted evidence of the severity of the trauma inflicted during one or other of her confinements, most likely during the first delivery. There was very little perineum remaining, and the cervix showed several deep lacerations, which divided its substance into lobules. Such a cervix is extremely prone to become the seat of carcinomatous change. I therefore, amputated the cervix, performed a perineorrhaphy and a ventro-suspension.

(To be continued)

## A CASE OF CHLOROFORM POISONING BY THE ORAL ROUTE

By P. B. MUKHERJI,  
Jalley P. O., Jogiara, Darbhanga

CHLOROFORM, when swallowed by the mouth in lethal doses produces symptoms similar to those produced by alcohol, causing coma with stertorous breathing and dilated pupils. As in alcohol poisoning, vomiting and convulsions are occasionally present.

The minimum fatal dose recorded for an adult is 38 drachms, whilst a case of recovery has been reported after swallowing 4 ounces.

Whilst I was at Warisnagar dispensary, in May, 1922, a nephew of my dispensary servant, aged 12, was brought to me for treatment. My compounder was in the habit of giving him chloroform water, dropping chloroform out of the chloroform bottle into the water, to satisfy his desire to drink sweet medicine. Once it happened that the compounder went out on business, leaving the chloroform bottle on the table and the dispensary open. The boy who was in the compound, seizing the opportunity, went inside the dispensary and knowing the contents to be sweet, drank an unknown quantity out of the bottle and was attacked in a couple of minutes with symptoms of poisoning.

My compounder returned in the meantime and finding him in this condition informed me

I observed the following signs and symptoms in the boy —

- 1 A burning sensation in the stomach
- 2 A smell of chloroform in his breath
- 3 Pupils dilated
- 4 Vomiting which started after two or three taps on the abdomen
- 5 After a little while the boy was drowsy and gradually became unconscious
- 6 The skin and the extremities became cold, the breathing became stertorous and the pulse imperceptible

The following treatment was adopted —

(a) The stomach was washed out with a warm alkaline solution of sodium bicarbonate

(b) An alkaline solution of sodium bicarbonate was also administered by the mouth to prevent acidosis of the blood

(c) The boy was kept awake by applications of cold water on the face, application of ammonia to the nose, and pinching, etc

(d) Finally, a hypodermic injection of 5 minims of liquor strychninae restored him to consciousness and led to his recovery

Since this type of chloroform poisoning (by the oral route) is extremely rare, the case may be of some interest

#### REFERENCES

- 1 Lyon and Waddell's Medical Jurisprudence
- 2 Sir Charles H. Bedford's "Symptoms and Treatment of Poisoning"

### A FATAL CASE OF POISONING BY NEO-KHARSIVAN

By Dr J P CULLEN, M.D. (Lond.),

Chief Medical Officer Burma Corporation, Ltd., Nanttu, Burma

As in some quarters the new arsenical preparations seem to be used, as quinine also still seems to be used, for diagnostic as well as therapeutic purposes perhaps the following case which recently came to my notice post-mortem may be of some interest to readers of the *Indian Medical Gazette*

The man in question was a well developed Anglo-Indian between 30 and 40 years of age. He had from his previous history received two injections of arsenical preparations some years before, and came under observation for joint pains and slightly irregular pyrexia

He received an intravenous injection of 0.45 gm Neo-Kharsivan and died suddenly about 30 hours later

*Post-mortem*—There was a scar in the left groin but no scar on the penis

The brain showed extensive hæmorrhage at the base extending down into the spinal cord. The subpial extravasation spread over the pons, cerebellum and inter-peduncular space, passing along the course of the middle cerebral arteries into each Sylvian fissure. In addition there were scattered hæmorrhagic areas on the cortex of the frontal lobe and at the apex of the right temporo-sphenoidal lobe. The choroid plexuses were intensely hæmorrhagic and there was blood-stained fluid in the lateral and fourth ventricles

The left kidney contained a reniform calculus about  $1\frac{1}{4}$  inches long. The right kidney was slightly enlarged and paler in colour than normal, the vasa recta standing out prominently

The liver was enlarged and pale

The heart, lungs and stomach were normal to the naked eye

Prior to injection the report on the urine was —

Reaction, alkaline, sp gr 1016, no albumin, no sugar, deposit, staphylococci and streptococci present, no gonococci found

The arsenical preparation was obtained from a respectable firm, and the sequence of events appears to be clear, the well known toxic action of the drug on the endothelium of the blood vessels falling entirely on the delicate structures of the pia-mater and choroidal plexuses

As, owing to misplaced energy, the brain was submitted to section during my absence, I regret that I am unable to send a painting of a somewhat striking appearance

### A CASE OF EXFOLIATIVE DERMATITIS AFTER NOVOARSENOBILLON INJECTIONS

By Capt. N N GHOSH, M.B.,  
*Serajganj*

Mrs —, aged 30, Hindu female, suffering from sore throat, cough and dysphagia, was found to have a fleshy mass in her throat, hanging from the left side of the posterior border of the soft palate and continuous with the uvula. She had a history of syphilis and her blood, examined in Calcutta a few days before I was called in to see her, gave a strongly positive Wasserman reaction. I put her on a course of novoarsenobillon injections at once, starting with 0.3 gm on the 23rd November, 1923. Two more doses of 0.3 gm each were given on the 5th December, 1923, and 12th December, 1923. Her condition improved rapidly and the growth in the throat was reduced in size and all her symptoms were relieved. On the 23rd December, 1923, another dose of 0.45 gm was given

After all these injections she had fever which lasted for about a day only. On the 1st January, 1924, I was informed that she had constipation and I prescribed a saline purgative. On the 3rd January, 1924, I was told that the saline purgative had not been taken by the patient and that she was doing well. On the 5th January, 1924, I was called in again to see her, when, to my surprise, I found that the patient had developed exfoliative dermatitis. She had felt an itching sensation all over the body after the fourth injection, but the eruptions appeared rather abruptly on the afternoon of the 4th January, 1924. Numerous blisters and some pustules formed, especially about the elbow and knee joints and the back of the thighs and a dry itchy scaly eruption almost all over the body. The patient was feeling very uncomfortable the face and the extremities were swollen and painful. The temperature was  $102.6^{\circ}$  in the afternoon. Some pustules had broken near the elbow joints and formed scabs. The itching and the tension all over the body disturbed her sleep at night. There were some eruptions inside the mouth and throat and feeding was difficult and painful. I prescribed calamine lotion for the weeping eczematous and pustular portions, calamine dusting powder for the dry scaly exfoliations and ichthyol pills internally and a saline purgative to relieve the constipation. But the friends of the patient got frightened and called in some other doctor and so I could not follow up the case. I hear that she is now gradually improving.

The urine of this patient was examined once before starting the injections and again before the fourth injection and every time it was found free from albumen and sugar. A similar case was reported by me in the *Indian Journal of Medicine* in March, 1922, from the military hospital, Mosul, where the patient was given 8 injections of kharsivan (0.3 gm each dose) and 8 grains of mercuogen intravenously in 8 consecutive weeks, as it was a bad case with extensive secondary eruptions.

In this case four injections of novoarsenobillon only were given at pretty long intervals. I think the constipation which the patient had after the last injection was probably the main factor in causing the unfortunate complication.

### INTERNAL VERSION IN A CASE OF FLATTENED PELVIS

By Babu RAM GARG, L.M.P.,  
Muzaffarnagar

A SOMEWHAT dwarfed woman, walking with a limp, complaining of pain in the hips, and

with a deformed pelvis, consulted the author in the 9th month of her fourth gestation, as at the last delivery she had lost her child, and was saved herself only with difficulty.

*Previous History*—She had given birth to three previous children, all males. The first two deliveries were normal, and were attended by *dais*. The third, which was an obstructed one, was attended by a lady doctor, and forceps applied. The child received injuries to its head and died within ten hours of birth. Measurements shewed the case to be one of flattened pelvis, and she was advised to call in the author when labour commenced.

At the commencement of labour a *dai* was called in and made three vaginal examinations, under conditions of gross sepsis. The author, a second doctor and a lady doctor were called in, and preparations made for forceps delivery under anaesthesia. This proving unsuccessful, the author advised internal version, which was carried out with very considerable difficulty. During delivery the arms became extended, and the head was delivered only with great difficulty and with the aid of external pressure on the abdominal wall.

The child was born in white asphyxia, and the usual measures, including Schultze's method of artificial respiration, proved unavailing. The child was changed from a bath of hot water into one almost ice-cold and cold water sprinkled on the face. It now commenced to breathe and was brought round. The child is to-day alive and well and in his sixth year. The patient made a normal recovery.

The patient's fifth and sixth deliveries were also conducted by the author, but in both cases *dais* had meddled with the case and had ruptured the membranes, with loss of liquor amni. At the seventh confinement, the author was fortunately called in before the membranes were ruptured. The os was found fully dilated, with the membranes projecting into the vagina and the head not engaged. The patient was anaesthetised, and the author immediately performed internal version. Delivery was easy, the child was born in good condition, and mother and child made an uneventful convalescence.

The author remarks that in such cases, internal version is far better practice than is the attempt to apply forceps,—which often means forceps above the brim. Where such internal version has to be undertaken it is very advantageous if the membranes are still unruptured,—as this renders the operation far easier. Finally, with patience and perseverance, many infants born in a state of white asphyxia can be saved by the application of suitable stimuli—(Abstract from original communication)

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Urethane	0.25 "
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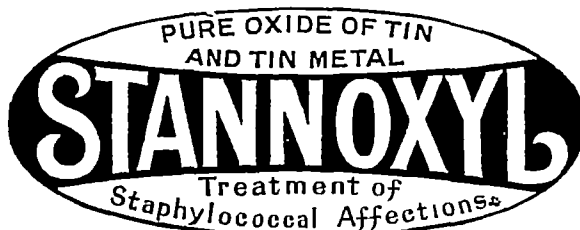
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# Indian Medical Gazette.

MAY

## MEDICAL EDUCATION IN INDIA

ALL who have experience of the medical schools and colleges of India realise that the curriculum has become an intolerable burden to the majority of medical students.

It is possible that the same thing is happening in the medical schools of England and America, but the students in those countries are probably saved from the worst effects of the evil system by their innate refractoriness and lack of docility. They are of robust constitution, they take more interest in games and a large proportion of them can contemplate without dismay the possibility of failure at their examinations.

Anyhow we are not concerned with their problem but with that of the Indian student who starts with obvious handicaps, he has to study in a foreign language, and though he has a fairly good literary knowledge of this, it is hard for him to follow lectures which deal with foreign ideas expressed in a foreign tongue. A vicious educational system has made it necessary for him to cultivate the receptive side of his brain rather than the reflective and originaive. He comes to his teachers imbued with an intense desire to learn, but he has already acquired the habit of trusting chiefly to his memory. His mental pictures consist of strings of words rather than of intelligent conceptions. In many cases he has already damaged his physique by overwork in unhygienic surroundings by lack of exercise and lack of nourishment and too often he has been the victim of repeated attacks of debilitating disease. He is already a survivor of the fittest when he begins the medical course, being one out of many who have aspired to enter the medical colleges. In many cases his survival has been paid for at a great price and already the grim struggle has left its mark on his body and mind. It is by no means easy to deal with the problem of the early training and the selection of the aspirant for admission to the medical colleges, if we could catch him and train him from his early years it is possible that much might be done, but the system of school and early university education forms so complicated and ponderous a machine that nothing short of reconstruction is likely to be of much avail.

If we have no power to deal with the question of preliminary education in a radical and thorough manner, it remains to be seen whether the best is being made of the student when he comes to our medical colleges.

The prospect of the European student when he enters on his medical course is sufficiently appalling, but how much worse is that of the Indian student whose one advantage over his foreign compeer is a higher degree of diligence

which is not an unmixed blessing to him? He struggles through his earlier examinations with a persistence which is worthy of the greatest admiration, all through his curriculum he toils with the energy of despair. Though a good many fall by the way-side, the majority just succeed in attaining to the minimum standards which are laid down. They do so at the cost of overtaxed bodies and brains which pay the penalty during the rest of their existence.

We are not speaking of the favoured youths who have such exceptional abilities that the strain is not excessive for them nor of those whose financial condition is such that they can afford to live in favourable hygienic conditions. Of the average student it is safe to say that the struggle is so severe that he is already seriously damaged for life before he has obtained his qualification. If the picture seems to be painted in lurid colours, will any one deny that it is not on the whole true?

There are two possible means of remedying the evils which have been described. The first is to arrange for a rational course of early education which shall prepare the student for his special life work, this course should develop his reasoning faculties as well as his memory, it should train him in observation and in manual dexterity, both of which are as essential to the doctor as good wind and sound limbs are to the athlete. When he has passed through his course with credit he should undergo a searching physical examination and if found in any way unfit he should be diverted to some other line of life which does not involve so great a physical and mental strain.

Having trained and selected the candidates, they should be given a training in medicine which is within the capacity of the average student instead of one which is only suitable for the favoured few. The medical course at the present day is so over-burdened that few even of the best students emerge with a clear conception of what they have been taught, while the average student has confused ideas and is unfitted for his life work.

Too long have the pundits who are responsible for the curriculum added one fresh subject after another to the course regardless of the impossibility of the task which they are imposing. It is not the student who is to blame, the poor man works with a diligence which is already excessive, it is the taskmasters who through lack of imagination fail to realise the limitations of human endurance. The entire curriculum should be surveyed afresh and ruthlessly cut down where it is possible to do so, a course of study should be mapped out which will include only the most essential matters. Even now we are engaged in making suggestions for the addition of experimental pharmacology and radiology and several other 'ologies' of the kind, but it is absolutely essential to ease the existing burden to a very great extent before we contemplate making any further additions to it.

We should keep clearly in view the purpose of the medical curriculum this is to train the medical men of the future in the management of the diseases which they are called on to treat

If our course of training turns out medical men of the greatest possible degree of efficiency, it is beyond criticism. If on the other hand we find that the young graduates can write dissertations on rare forms of disease but have no clear ideas on the diagnosis and treatment of malaria and dysentery, we cannot claim that the best has been made of the six years' course of training. The regulations of the General Medical Council restrict our action in framing courses of studies, but within the boundaries laid down great freedom is possible. In the case of the Medical Schools the Medical Council cannot be held responsible for any defects in training and it is in them that reforms can most easily be carried out.

The curriculum, the selection and special training of the teachers, the organization of the courses of instruction and of the examinations deserve the closest investigation with a view to their adaptation to the needs of the students and of the community.

## Current Topics.

### The British Empire Leprosy Relief Association.

OUR readers will doubtless have seen accounts in the daily papers of the very successful public meeting held at the Mansion House London, on the 31st January 1924 for the purpose of launching a campaign on behalf of this splendid project. Amongst others present were Lord Chelmsford the Duke of Devonshire Sir Sydney Oliver Sir H. P. Rolleston, Lord Ronaldshay and General Sir Charles Yate, M.P. The following account which we have received from Sir Leonard Rogers however will be of special interest to our readers—

The campaign of the British Empire Leprosy Relief Association to rid the British Possessions of the disease was launched at a meeting at the Mansion House on January 31st with the Lord Mayor in the chair, who read a message from the Prince of Wales as Patron, wishing success to the meeting and saying "The elimination of leprosy from the British Empire is a wonderful ideal alike for British medical science and for British administration. His Royal Highness is confident that this ideal can be realized if the Association is accorded the support it merits." Lord Chelmsford, chairman of the general committee, announced that the King and the Prince of Wales had each contributed £100 to the fund. He explained the origin of the movement and its imperial character, and read a message from the Viceroy of India in which he said "I am convinced by the good results already obtained in India from the new treatment, that the time is auspicious for an earnest campaign to combat this terrible scourge." The Foreign, Colonial and India Offices supported the movement and had nominated official representatives on the committees, while the High Commissioners of the Dominions and well known administrative and medical authorities had also joined it. The Duke of Devonshire was confident from his recent experience at the Colonial Office that

with steady consistent work the disease could not only be relieved and alleviated, but that it could be exterminated. Mr Thomas also sent a message from the Colonial Office sympathising with and supporting the work of the Association.

Sir Humphrey Rolleston referred to the prevalence of leprosy in Great Britain in the middle ages, and stated that the disease is contagious, but not hereditary. As the greatest colonizing power the world had ever seen it was our obvious duty to eliminate this awful scourge, at least 300,000 cases of which were present now in the British Empire including 102,000 officially recognized cases in India, and probably at least as many undetected cases, only some 8,000 of whom were yet cared for while leper colonies should be rendered attractive and pleasant, instead of living prisons. Segregation alone was not sufficient to stamp out the disease, prevention and cure being closely related for if the patient is detected in an early stage and cured his power of spreading the disease is thus prevented for which further endowment of research is needed. "There appears to be good reason to believe that Sir Leonard Rogers has found in the fatty acids of certain oils and in the preparation called morrhuate of sodium a remedy that bids fair to be a real cure. Further work remains to be done, he is the man and is here to do it. It is not always that the right man and the means for a success are available it is therefore obviously up to us to give him the full opportunity."

Sir Leonard Rogers then spoke as follows—

"My Lord Mayor, My Lords, Ladies and Gentlemen I desire in the first place to thank you my Lord Mayor for your hospitality on this occasion, which I venture to think will prove a red letter day in the three-thousand-year old struggle against the most cruel disease human flesh is heir to. I also wish to thank all those who have so willingly lent their invaluable aid to the new movement to rid our empire of leprosy and especially to thank Lord Chelmsford, whose cordial response to my appeal for help encouraged us to proceed with the formation of the British Empire Leprosy Relief Association."

"Sir Humphrey Rolleston has given you a lucid account of the great difficulties hitherto encountered in dealing with the scourge in the absence of any effective treatment. It is now my privilege to tell you of the recent advances of medical science, which have already gone far towards removing the principal obstacles to progress and opened up hopeful prospects of relieving and also of reducing, and eventually stamping out the disease from large areas of the British Empire if only funds are forthcoming to bring within the reach of the afflicted the blessings which have at last been furnished by medical progress."

"Leprosy is due to a bacillus belonging to the same group as that of tuberculosis, with which it has many epidemiological points of resemblance. In the epoch-making researches of the last three decades in tropical medicine leprosy has not been neglected, but several promising methods of treatment failed to produce lasting results. The only remedy known to have some retarding effect on its progress is the old Indian drug chaulmoogra oil, but its oral administration failed to clear up any but a very few incipient cases. Intramuscular injections of the oil were reported in 1913 by my friend Dr Heiser the founder of the Culion Island settlement in the Philippines to have cleared up the symptoms of 11 per cent of a small series of cases after some eighteen months of painful injections and in 1916 Dr Heiser when visiting Calcutta urged me to take up the subject, which I had long been interested in and as early as 1912 I had tried to obtain a soluble preparation of the active portion of chaulmoogra oil suitable for injection, on similar lines to my discovery of the value of emetine injections in dysentery, derived from ipecacuanha powder. I set to work again and obtained a soluble sodium salt of the fatty acids of chaulmoogra oil which was rather irritating hypodermically, but which could be injected directly into the

blood stream with safety and with very beneficial results. I soon obtained evidence that by this method the lepra bacilli could actually be destroyed within the tissues, with eventual disappearance of all signs and infectivity of the disease. I next obtained similar effective soluble substances from cod-liver and soya bean oils, which have since been added to by Dr E. Muir who has continued my researches on leprosy at the Calcutta School of Tropical Medicine. At the end of over four years of patient work 82 per cent of 50 cases treated for three to eighteen months were either greatly improved with good prospects or eventually completely clearing up or had already lost all symptoms and become free from the lepra bacillus, a little over half falling in the latter apparently cured class.

The next advance we owe to American workers at Honolulu when in 1919 Professor Dean and Dr Hollmann introduced the more convenient intramuscular injection of a slightly different compound ethyl chaulmoograte which has now been used with considerable success in many parts of the world, a recent trial in the Cuhon settlement on no less than 4067 lepers having shown 56 per cent improved and 36 per cent more in which the progress of the disease has been arrested. Still more striking is the fact that while only 26 per cent of those treated for less than three months had improved, after 6 to 9 months treatment 74 per cent and after 12 to 15 months no less than 93 per cent were definitely improved and a number had lost all their symptoms, thus furnishing most conclusive evidence of the great advance in dealing with this hitherto intractable disease.

To those who have had much experience of medical work in India and other tropical countries, equally conclusive evidence is furnished by the fact that in many places numerous lepers are now coming forward in the earlier stages of the disease and submitting willingly to weekly injections for many months although such races will not continue a troublesome treatment unless they are absolutely convinced of its very beneficial effects so I need say no more on this point. It should however be mentioned that in leprosy as in tuberculosis much caution is necessary in speaking of a cure as relapses have occurred due to the failure to continue the treatment for some time after the symptoms have disappeared. Some of my earlier cases have remained well for six to eight years so there is good reason to believe that permanent cures can be effected although of course lost fingers and toes cannot be replaced and there is a definite limit to the efficacy of the treatment in long standing and advanced cases, although recently received photographs show astonishing improvement even in some of the most advanced nodular cases. Moreover Dr Travers in the Federated Malay States in about two years cleared up completely a sufficient number of lepers to furnish a full staff for his leper institution. In Honolulu Dr McDonald reported that of 78 successfully treated cases every single one remained perfectly well from 1 to 2½ years later. Yet up to the present time not more than 5 per cent of the lepers in the British Empire are receiving the new treatment and in a number of our colonial reports especially from Africa, want of funds is stated as the reason why so little can be done for the lepers hence the necessity for our appeal.

But apart altogether from the still incompletely settled question as to what proportion of lepers can be cured in the very practical sense of losing all symptoms and infectivity and being restored to health and usefulness the recent advances are rapidly removing the greatest obstacle to the reduction in leprosy by the segregation methods we have hitherto been almost entirely dependent on namely the impossibility of finding and isolating lepers in the early stages of their disease before they have infected other members of their households for even in Norway only one out of every six lepers was discovered during the first three years after the appearance of the symptoms

extensive hiding of the early stages being inevitable as long as we have nothing better to offer them than life-long separation from their relatives without hope of recovery. Nowhere was this difficulty greater than in Hawaii and the Philippines, yet since the introduction of the improved treatment on a large scale in both countries by the Americans increasing numbers of early cases have voluntarily come forward for the treatment. The same is true in India Dr Muir having treated 500 lepers in his Calcutta clinic in two and a half years including many early ones while Dr Eleanor Kerr after obtaining great improvement in 66 per cent of her cases and 125 per cent completely cleared up is unable to find room in the Dichpali institution for hundreds of those asking for the treatment and the same is the case in Korea and other countries. Yet it is just these earlier cases which benefit most by the new methods while removing their infectivity before they have had time to infect others will save another generation from the disease, and among the more intelligent patients it will also be practicable to examine such of their relatives as have been exposed to infection for the earliest and most easily eradicated signs of the onset of leprosy and thus diminish the number of foci of infection in a manner hitherto undreamt of.

#### METHODS OF WORK

"I must now turn to the methods of work unanimously decided on by our Medical Committee under the Chairmanship of Sir John Rose Bradford, FRS and including members with long experience in Africa, India and China, the three most infected countries in the world. The Committee is convinced that the time is fully ripe for a serious effort to bring the improved treatment within the reach of as many as possible of our lepers without waiting for the discovery of a perfect cure for every case, however advanced. In this great task we propose to work through existing agencies such as hospital and dispensary clinics on the lines of the successful Calcutta one which should be opened in every important centre in the endemic areas for the treatment of the early cases leper institutions and colonies for more advanced cases which should in future be regarded as hospitals and not asylums for the helpless outcasts, and should be on the lines of those now being established by the Provincial Governments in India and the admirable institutions of the Mission to Lepers with whom we are working in the closest sympathy placed in the country with land for cultivation and not prison-like town asylums and with the best treatment.

"With the kind help of the Foreign Colonial and India Offices and of Missionary bodies we have already sent out to all leper institutions in our countries a questionnaire drawn up by our Medical Committee asking for various items of necessary information and how we can best help them and we also propose to distribute the improved drugs with details as to their use and abstracts of current literature on leprosy as it appears, which will enable us to obtain extensive expert trials of all further improvements in the treatment and thus to stimulate and co-ordinate the clinical and research work throughout our scattered Empire. As it has been found in India and the Philippines that considerable experience and minute attention to investigation are essential to obtaining the best results we carried on to assist the training in such centres as possible, for the medical staff of leper institutions the necessity of

Secondly, we are anxious to help the most up-to-date, if possible, with funds, soundings, and easy access to the best of the best, they continue, 'that countries where the numbers are vast, that some of the permit the isolation of that some of the workers patients in order to be capable as they were thought to create or the disease, single great success will be worth only about 1000 £ is likely to be spent in this way could be mentash, catch all the young men you can for a serious at their measurements and microscopes, object lesson at it as long as they are willing to stay

The larger the number of seekers the larger the number of finders. Drop the failures, cut the losses, and think only of the profits. To them the other party, the 'Bears,' reply, 'You can spend what money you like, but you cannot buy Discovery. All that your managing committees and trained investigators are likely to do or achieve will be the study of details along already well-trodden paths. They will inoculate legions of rats and guinea-pigs and will publish profound but incomplete papers every quarter, which will be of little or no use in practice. They will carry out researches—yes, academical researches, and too many of them. But the world does not ask for researches, it asks for discoveries—not for the incomplete but for the complete article. Has a single great medical discovery been made by managing committees and subsidised investigators? Discoveries are made by genius—and that you cannot buy.'

"Such are the opinions which one hears on both sides. Personally I agree and yet disagree, with both. There is only one way to decide. Research and Discovery are themselves natural phenomena, and we should study them scientifically. I said we have discovered Discovery, let us also investigate Investigation. How? By consulting the great and triumphant history of science, particularly the stories of the chief advances. If we do so we shall see that the two parties are merely quarrelling over the two faces of the same coin. Science proceeds, not in one but in two ways—first, by collecting facts, and then by basing inductions upon them. By the middle of last century numbers of workers including Buffon and Linnaeus and a host of private enthusiasts and amateurs, had observed, distinguished, and described innumerable kinds of plants and animals, then came Darwin who explained these facts—much more numerous than he could ever have collected single-handed—by his Theory of Evolution.

"Certainly observation and induction have often worked together in the same research, with brilliant results. More often they pull different ways and break down. Everyone knows the man who begins with his induction and then fits his facts to it—or thinks he does. On the other hand, the 'working hypothesis' frequently suggests invaluable though possibly negative, experiments. Then we have the men—generally young men—who make a new generalisation with every new observation. I was one of them once. Often however, observation and induction require very different faculties, which belong to different men, often living in different ages. If we were all Newtons there would be no problems left to solve.

"Science needs all the faculties—the eye of one man, the hand of another, and the brain of a third. Observation is at least as necessary to it as induction. Therefore, I do not agree with the party of the 'Bears' when they depreciate subsidised investigations carried out by full-time workers under managing committees. The present state of medical science requires constant physiological pathological therapeutic and biochemical researches, often involving delicate measurements, which cannot be made by medical practitioners outside laboratories or even by teachers in the medical schools in their spare time. Spend, therefore, as much money as you can raise for this purpose, let every budding Pasteur have his chance, and pray for a Rockefeller. But at the same time considerable waste must be expected and allowed for. One does not envy committees of management. As Sir Ernest Rutherford recently said in his address to the British Association, 'Those who have the responsibility of administering the grants will need all their wisdom and experience to make a wise allocation of funds. It is fatally easy to spend much money in a direct frontal attack on some technical problem of importance, when the solution may depend on some addition to knowledge which can be gained in some other field of scientific enquiry, possibly at a trifling cost.' I can adduce many other difficulties. Workers are apt to be called away to other posts before their task is complete. Then

who can know when an old vein is exhausted, or whether a proposed new line is really promising, unless he himself has worked at the job?—and few committees can consist of specialists in all possible lines. In my own subject, I have known men employed who had never read the literature, who dug up again old disused workings, or who chased the wild goose with a pinch of salt for years—all costing money. But the greatest waste is caused by the large number of incomplete articles constantly being published, which, though they may be good so far as they go, are lost in the mass of literature—so that when the man who clears up the question finally arrives he is obliged to rediscover all the matter for himself. But in spite of these difficulties I agree with the 'Bulls'. The world must continue spending money in this way, and it will improve the system with practice.

"Now, for the other side—the obverse of the medal. One of our most distinguished physicians told me a few months ago that someone had accused him of not really being a man of science because he did not work in a laboratory! Yet he has made more valuable additions to medical knowledge and practice than has fallen to the lot of most laboratories. Consider this point carefully. The work of the laboratory has almost always been the collection of facts and measurements, the elaboration of detail, the testing of theories, but the other side of science, the great inductions which have solved problems or have applied facts directly to the cure or prevention of disease have been made mostly by that humble individual, the 'private enthusiast'—generally either a teacher or a 'mere doctor'. William Harvey was a mere doctor, Edward Jenner a mere country doctor! What laboratory did Jenner require? He did not even use a microscope, and yet he gave to humanity the greatest single boon which it has ever received, and which also initiated our present knowledge of immunity. Pasteur was a professor of chemistry. Lister was a practising surgeon, here in Glasgow. Robert Koch was also a mere practising country doctor when he discovered the bacilli of anthrax and of surgical sepsis, the staining of bacteria, and plate-cultivation, thus making practical bacteriology. Manson was a doctor in China. Laveran, Bruce, and Leishman were, or are, army doctors. Need I mention any more names?—I should have to hurl almost the whole history of medicine at you! Where were the laboratories of these men?—in their own hospitals and consulting rooms. Where were the laboratories of Kepler and Newton?—in their own brains. And who are making the innumerable advances which we see to-day in connection with medical, surgical, and sanitary practice regarding almost all diseases? Very largely our professors, our teachers, our laboratory workers, it is true, but also, and not less, our clinicians and our hygienists.

"We see, then, that there is much to be said for the 'Bears' as well as for the 'Bulls'. It is an historical fact that most of the greatest advances have been made by men who were not subsidised for their researches. I think, therefore, that the whole field of public support for science should be broadened so as to include such men. At present the public gives considerable sums for institutional investigations with the test-tube, the scalpel, and the microscope, but little or nothing for workers outside—that is, it supports, and rightly supports, observational science, which is largely ancillary, but scarcely helps those great intellectual investigations which mostly obtain the final or useful results.

"It seems to me that all this is very 'bad business'. We should pay not only for expectations but also for results. I should like to see the whole medical profession brought into the research fold—not in laboratories, but in their practice, their consulting rooms, and their own brains. Someone will say that the private enthusiast will continue to work whether we help him or not—surely the meanest argument ever used—but will he? Then someone else will exclaim that there

is nothing to hinder any and every medical man from investigation. I am not so sure. True, hundreds or thousands of them are now actually thus engaged, and, in fact, are obtaining the important results just mentioned, but large numbers of medical men cannot always afford such a luxury, because they have to maintain their practices. The reason for this is that while chemical researches which improve medical and surgical treatment often enhance practice—and very deservedly so—other scientific work such as physiological and pathological studies which are off the main lines of clinical research, often, notoriously injure practice. There is still a feeling that a man will not be 'a good doctor' if he takes to flying the scientific kite too often. Thus, everyone knows that both Harvey and Jenner ruined their respective practices by their scientific studies. Then there is a third class of effort—perhaps the very highest class of medical work—which is concerned with the prevention of the great epidemic diseases. At present it receives no payment whatever, either from practice or otherwise. What has been done for example, for Mr W M M Haffkine or for Mr E H Hankin—both laymen and private enthusiasts—whose studies have saved untold numbers of lives from cholera and plague in India and elsewhere or for the almost unknown doctors who discovered that plague—the world destroying plague—is carried by the rat-flea?

"Such drawbacks—and others—are unfortunate, because they tend to impede enlistments in the great voluntary army of medical science. Our friend the private enthusiast is a rare species and the successful enthusiast is very rare indeed. You cannot subsidise him beforehand, because you cannot discover him until he has done his work. You can supply him with laboratories, test-tubes and microscopes—if he wants them, but you cannot pay him for his thoughts, his calculations, or his natural aptitude nor, above all for that passion for discovery—for discovery, not merely for investigation—which drives him over every obstacle to his ultimate goal. You cannot subsidise him—and you cannot reward him either. It is beyond the power of the whole earth to reward him. His discovery is his reward. But still you can do something for him in a small way. In 1802 and 1807, Parliament compensated Jenner for the loss of his practice, in 1884 the German government did the same for Robert Koch, and, quite recently I understand the Canadian government has very wisely, shown the same consideration to Dr Banting for his brilliant labours on insulin. The least that the world can do for the successful investigator whomsoever he may be is to pay honourably such of his little out-of-pocket expenses and losses as he may have incurred in the world's service and the most that the world can do for him is to keep him at work. This is the way in which money can now be most profitably spent for science. I see that Sir Alfred Yarrow has recently given a fine donation which is to be devoted partly to this purpose. If I were a millionaire I should follow his example.

"It is often said that there is no such thing as discovery—that each advance is built upon previous advances. True, but what is the interval between these advances? Many people carry on incomplete investigations and just miss their triumphant culmination. The culmination is the discovery. I have often wondered how it was that those wonderful people, the ancient Greeks missed four great discoveries which they seem to have been on the point of achieving—the Calculus, Evolution, Electricity and Vaccination. As it is, the world was obliged to wait for nearly two thousand years before these little 'advances' were made. It awaited the proper men. Only the other day an able biochemist said to me that probably most of the facts regarding the complicated diseases of metabolism are already known but that another Newton is required to integrate them. Such, I think may also be the case regarding other grave medical problems as for instance, that of cancer. Possibly the discovery may already be made, but there is no one to drag

it forth into the light. In science, as in art, the man is everything.

"I must make one more remark. What always amazes me is the fact that there are millions upon millions of human beings whose health and whose very existence are constantly threatened by numbers of diseases, and yet who never subscribe one farthing for the medical researches which endeavour to defeat these terrible enemies of theirs and which often succeed in doing so. Yet thousands of these same people pour out their subscriptions and bequests for all kinds of projects, many of which are futile, while even those good and generous people who maintain our hospitals and universities seem often to forget that behind hospital practice and behind university teaching there is the great science which inspires both.

"So, I have now tried to give you a brief review of what may be called the 'Natural History of Discovery'. 'The management of medical research' will lie in the hands of you young men but you must study the book of the past in order to direct the advances of the future. I hope that most of you will be 'mere practising doctors' but if so let every afferent and efferent nerve of your thoughts connect the brain of science with every sense muscle and faculty of your practice. The practitioner nowadays cannot live apart from science trying to evolve wisdom from his own meditations like a hermit in the desert. You must not only observe but think and not only think but read. Your first duty will be the cure or prevention of sickness but some of you in your leisure may perhaps try to solve problems, may become enthusiasts may even become wild enthusiasts—I cannot imagine a nobler fate. Even perhaps one of you—probably not more—may be destined to become the Newton or Einstein of some hitherto undreamed of synthesis. I hope so. Science has measured the stars and the atoms, has knit together the corners of the earth and has enabled us to fly over oceans and deserts but her greatest victory remains to be won. Why should we men heirs of all the ages continue to suffer from such mean things as diseases? Are you going to be defeated any longer by bacilli, rat-fleas and mosquitoes? It is for you to conquer them and remember that every gift of science is a gift not to one country or to two countries not only for to-day or for to-morrow but to the whole world and for all time—until, as the poet said 'the future dares forget the past'."

### New Year Honours

(*Brit Med Jour*, Jan 5, 1924 p 28)

THE list of new year honours contains the interesting announcement that a knighthood has been conferred upon Dr Harry George Waters, principal medical officer East Indian Railway, the C B (Military) is conferred upon Air Commodore David Munro C.B.E. Medical Administrator Royal Air Force, the C I E is conferred upon Behari Lal Dhingra, M.D. Chief Minister Jind State, Punjab, the Kaiser-i-Hind medal of the first class for public services in India is conferred upon Dr Augustus Sousa, Assistant Director of Public Health, III Range, Allahabad United Provinces and on Dr Louisa Helena Hart, medical missionary, Madanapalle Madras.

We offer our congratulations to these medical workers on the well earned honours which have been conferred on them.

### Typhus Fever in Greek Refugees

AN article on typhus fever in Greek refugees by Major-General Sir Patrick Hehir K.C.I.E., C.B., C.M.G. (ret'd) appeared in the *Annals of Tropical Medicine and Parasitology* for October 13, 1923. He came into contact with about one thousand two hundred cases of typhus fever in Greece.

Greek refugees primarily brought the disease with them from Asia Minor and the Near East. In the

areas in which the refugees have been widely dispersed on the land there has been no typhus, or it has not gained a foothold when introduced, the brunt of the epidemic has been borne by the larger and medium-sized towns, the smaller either escaping, or being only slightly invaded. The outbreak attained its maximum of intensity in the midwinter.

Overcrowding was excessive in the affected places. Many of the people were half starved and some had only one suit of clothes. The head louse must not be ignored when devising preventive measures. Most cases were admitted into the hospitals on the fifth or sixth day of the disease. The symptoms were those usually encountered. The temperature usually fell by lysis occupying forty-eight to sixty or seventy-two hours. Irregular temperatures were met with, a definite crisis with a fall of temperature to normal in twenty-four or thirty-six hours may occur, although this is exceptional. The duration of the fever was twelve to sixteen days. The pulse, however, was liable to show much variation, sometimes marked oscillations occurred in the twenty-four hours, being at one time ninety and at another one hundred and twenty. The respirations were shallow and from thirty to thirty-five per minute.

The eruption is described in some detail, it first appeared on the evening of the fourth day in the form of discrete and well-defined pink or roseolar spots which may be round, oval or irregular, varying from 2 to 5 mm in diameter vanishing on pressure, they were seldom palpable at this stage, but they were widespread though scanty, and were seen on the abdomen back, chest shoulders arms legs and feet, they were rare on the face and head. In this early stage the rash described was not very obvious. The macules then became larger and of a bright red colour, next assuming a purplish-red hue running into dark purple. At this stage the tendency was for the eruption not to disappear on pressure but this was not invariable—in many cases ending fatally with a deep coloured eruption before death no sign of it remained *post-mortem*. When the eruption was fully developed on the eighth or ninth day, well-defined dark coloured petechial areas which did not disappear on pressure were seen, besides less-defined patches of much lighter colour which did not disappear on pressure. In all severe cases with typical eruption, these erythematous and petechial patches were met with during the second week of the disease. In blonde boys and girls, during the early stage of the disease there was sometimes seen on the chest, neck, arms, and occasionally on the abdomen, an irregular or blotchy erythema which vanished before the real eruption was developed. In the second week the eruption had a multiform character—roseolar patches, red spots, maculae small petechiae and large plaques typically petechial were seen, this multiformity was well seen on the shoulders and back, lower part of the abdomen and hips, outer surface of the arms and forearms, on which places what has been admirably named 'subcuticular mottling' was also visible. The eruption, however, varied from that consisting of only faint roseolar slightly raised spots to large ecchymotic looking patches. By the end of the second week little of the eruption was left. In some cases the general lousiness antecedent to the onset of the disease leads to considerable skin irritation with scratching and local secondary infections, which may initially be rather puzzling. In about one per cent of typhus cases there was either no eruption or only a faint roseolar one, this is more frequently the case in children and adolescents. To bring out the eruption Sir Patrick recommends rubbing the skin with petrolatum, the lesions are then seen to consist of a congeries of dark red blood vessels.

In all hospitals dozens of cases of recurrent fever were sent in as typhus and some cases of typhus and relapsing fever ran their course concurrently in the same persons. It is interesting to note that, contrary to the rule with intermediate hosts, the virus of typhus is believed eventually to kill the louse.

The Weil-Felix reaction was found to be very distinctive. The minimum dilution accepted as positive was 1 to 100. Practically the serum of every typhus fever case after the eighth day was positive, whilst that of other fevers was negative.

The average mortality in the infectious diseases hospitals near Athens was roughly 10 per cent, it was however higher in some towns. In refugees of 50 years and over, the death rate was high, reaching in some towns 50 per cent. The routine plan adopted in admitting typhus fever cases into hospital was to admit them to a receiving-room, to which all patients were primarily brought. Here the hair of the head is rapidly cut off with a machine clipper, the hair of the axillae and pubes being shaved off, the hair is to be burnt. The receiving-room should communicate with the room or other area containing the steam-disinfector on the one hand, and with the bath room on the other, this latter should lead to the dressing-room. After removal of the hair the patient is put on a stretcher and conveyed to the room containing the disinfector. Here he discards everything that he brings with him, which is disinfected. He is taken to the bath room and bathed. He is then put on a clean stretcher and removed to the dressing-room, here he receives a suit of clean hospital clothing and is taken to the ward he is to occupy. There must be no remission in this routine, it must be thoroughly carried out if the wards are to be kept free from infected lice. Nothing that the patient brings with him to hospital should enter the ward.

Thoroughly deloused typhus cases are perfectly innocuous to the uninfected, and the author is quite confident as regards the efficiency of the delousing arrangements, there is no reason for putting cases in different wards.

The value of prophylactic inoculations of killed virus was uncertain, apparently the use of small doses of the blood of typhus cases as a prophylactic has been found successful in experimental monkeys.

Prevention consisted in systematic delousing of all bedding and clothing, being put through the steam disinfectors. The entire floors were washed with disinfectants and the walls whitewashed. Every room was emptied of its entire contents while this was going on, then all the belongings of the refugees returned to the cleaned rooms, which were shut off from those awaiting their turn. If fresh cases appeared the process was renewed until the disease died out. All men's and boys' heads were shaved, and all girls up to the age of fourteen had their hair bobbed. A mixture of equal parts of kerosine and olive oil was used for nits and N C 1 powder (naphthalene ninety-six parts, creosote two parts, iodoform two parts) in little bags was worn for a week under the clothes, when a fresh bag was issued.

An adequate supply of steam disinfectors for delousing clothes and bedding is almost indispensable, in their absence the task is most laborious. In small communities, Serbian barrels and other such improvisations may be useful, but in dealing with large masses of people they are futile.

It was found worth while in every camp to endeavour to educate the people in regard to the nature of typhus and the principles that underlie its eradication and prevention. Leaflets were used for this purpose which were read out periodically for the benefit of the illiterate. All that is necessary is that the person who is a contact should be watched carefully for twenty-one days, that is the time laid down as the incubation period.

The management of typhus is of course on exactly the same lines as that of relapsing fever, which is one of the great diseases of India. The details of the control methods which were found successful against typhus in Greece should therefore be known to everyone in India. We wonder whether typhus fever may not be found to be more common in India than has hitherto been realized, the conditions for spread of the disease are present in many places in this country, and



the diagnosis is notoriously difficult. For this reason we have given special attention to this excellent account by Sir Patrick Hehir.

## The Treatment of Asthma with Combined Peptone and Vaccine.

By JOHN VEITCH, M.B. Ch.B. (Edin.)

(*Brit Med Jour*, Jan 5, 1924, p 13)

THE author employs a system of giving a course of injections of peptone and vaccine combined in one solution. The solution used was in three strengths, as follows—

A 5 c.c.m. of 5 per cent solution = 0.25 gram peptone

+ 235 million organisms mixed catarrhal vaccine

B 5 c.c.m. of 10 per cent solution = 0.5 gram peptone

+ 940 million organisms mixed catarrhal vaccine

C 10 c.c.m. of 10 per cent solution = 1 gram peptone

+ 1,880 million organisms mixed catarrhal vaccine

The injections were given every seven days for the first four weeks half a tube of A solution per week for the second four weeks half a tube of B solution per week and so on, increasing in strength of dosage. The injections were given intramuscularly in the so-called painless area just below the anterior superior spine of the ilium, by means of an ordinary-sized serum needle, the needle being pushed in till the bone was felt then slightly withdrawn and the contents of the syringe injected. On withdrawal of the needle the area was briskly massaged with a hard pad of cotton-wool to diffuse the fluid through the tissues.

A sharp reaction usually followed in about six to eight hours, there was some local redness and tenderness, and the temperature rose a degree or so. Further, there was a tendency to perspiration, but no other symptoms developed. The injections were given at night, and the patient was able to be up and about the next day without discomfort. No special diet or medicinal treatment was indicated. The results of the treatment of twenty-four cases by this method are given.

The number of injections given was twelve to twenty-four and in most cases a cure or great improvement resulted.

## The Pharmacology of Mercury

A REVIEW OF SOME LITERATURE

By RUSSELL VAN ARSDALE LEE, M.D.,

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(*Jour Amer Med Assocn*, Nov 24, 1923, p 1748)

IN 2637 B.C. the Chinese Emperor Hoang-Ty collected the medical literature of his day and in these books the use of mercury by friction for a disease, which it is not difficult to believe was syphilis, is described as even then a procedure of some antiquity.

When the great epidemic of syphilis swept over Europe, at the end of the fifteenth century, the use of mercury became general in the scourge.

The use of mercury for many diseases other than syphilis became so general and so poorly supervised during the eighteenth century that calomel became a household drug, and the "mercurial disease," with all the symptoms of chronic poisoning, appeared and became the subject of considerable writing.

After some reaction, traceable to its misuse, Ricord, Hebra and others placed it once more on a firm basis. In 1892 another advance in its use was marked by the introduction of the injection of mercury by Baccelli. The discovery of arsphenamin by Ehrlich threatened once more to remove it from the pharmacopeia, but its use has persisted. At present, the most interesting work is being done in connection with synthetic

mercury compounds, which are intended to take advantage of the beneficial while avoiding the toxic effects. This work, while very new, has already produced mercuriophen, mercurochrome-220 soluble and flumerin, and more and better drugs in the near future are promised.

The pharmacology of mercury is still in an unsatisfactory state, its use is still on an empiric basis, *how its beneficial results are achieved is not known*.

Mercury is absorbed from all surfaces, from the skin, the alimentary tract, the lungs, the rectum, the vagina, the surfaces of wounds, and from subcutaneous subdural, intramuscular and intravenous injections.

The absorption from the gastro-intestinal tract is uncertain, and quantitative experiments on it have been few. Metallic mercury and mercuric sulphide are very slightly absorbed when given by mouth. A small proportion of calomel is absorbed, the greater part being swept out. The soluble salts, such as mercuric chloride, which can form an albuminate with the mucous membrane of the intestinal tract, are almost completely absorbed.

Absorption by the skin occurs even when the surface is intact, probably by way of the hair follicles and ducts of the sweat glands. Only a small part of the mercury that is rubbed on the skin is absorbed, and according to Cole just as much if the excess ointment is washed off with soap and water after rubbing for a half hour as if it is left on as is the general practice.

Injection is becoming the most popular method for mercury administration, and much work has been done on the quantitative absorption after it is given in this way.

With the benzoate almost complete absorption occurs in fourteen days but with half left unabsorbed in seven days. With salicylate, the absorption was more rapid four-fifths being absorbed in four days, and all of it in ten days. The absorption of calomel was very much slower less than one-half being absorbed in ten days. Mercurial (gray) oil was very slowly absorbed, less than one-third being absorbed in three weeks.

Mercury finds its principal use in the treatment of syphilis. Next in importance are the laxative and diuretic actions of calomel. Formerly, mercury was much used in the treatment of many other diseases, especially yellow fever and other tropical diseases. Recently Veck and others have again recommended it for influenza and other acute conditions. In view of the favourable results that were formerly obtained by it in these diseases, it may be possible that the modern therapist is overlooking something in the comparative neglect into which mercury has fallen for diseases other than syphilis.

Administration by mouth, as judged by excretion curves, etc., is an uncertain method. Usually very little is absorbed with most of the preparations used. In order to reach really effective dosage by the oral route, the patient is exposed to the sudden and inexplicable absorption with subsequent poisoning, which sometimes occurs. Inunction provides a steady and fairly reliable, although somewhat slow, method of administering mercury. The excretion curve is often slow to rise, but can be kept fairly constant from day to day when a level is reached. Absorption can be quickly stopped when the first symptoms of mercurialism appear.

Treatment by intramuscular injection is, of course, more accurate and reliable, but the choice of the preparation to be used is of the utmost importance. The use of calomel and mercurial oil injections seems illogical and dangerous.

Salicylate is quickly absorbed and is excreted with great rapidity and probably a large part of it is never broken down to give mercury action. This drug appears to be only a feeble mercurial. The soluble salts are quickly absorbed and easily controlled, but painful when given by intramuscular injection.

Intravenous administration suggests itself as a method of eliminating some of the objections to the other methods. However, it presents some danger perhaps from embolism although many thousands of injections of the cyanide are reported to have been given in the French army without serious accidents. The mercuric salts are very prone to obliterate the vein used for injection. Nixon has suggested that this can be avoided by withdrawing blood into the syringe in which mercuric chloride solution is contained, causing thereby a precipitation of the albuminate, which, being soluble in an excess of serum is redissolved when more blood is withdrawn and mixed with it. Then the whole amount may be injected without causing any obliteration of the vein.

The most interesting recent work with mercury has had to do with the development of new synthetic compounds designed to reduce the toxicity and preserve the desired effect, in the manner in which arsphenamin was brought out. This work has already resulted in the production of a number of useful drugs, among which may be mentioned mercuraphen, mercurochrome-220 soluble, and flumerin. The method used by Hill and Young in testing these new mercurials, and incidentally all the old compounds, is a highly commendable one, and more drugs should be subjected to it. It consists in determining the amount and dosage of the drug that is necessary to render the regional lymph nodes in a syphilitic rabbit non-infectious and is correlated with observations on the course of the testicular lesions that are produced experimentally. It is possible that the next great advances will be along the lines of these synthetics.

### Use of the Microphonic Stethoscope in Demonstration of Fetal Heart Tones

By F. H. FALLS, M.S., M.D.

and

ALAN C. ROCKWOOD, B.E., M.S.

Iowa City

(*Jour. Amer. Med. Assocn.* Nov 17 1923, p 1683)

A microscopic transmitter of the carbon type in which all sounds of frequencies above that of the heart were damped out has been used successfully by Abbott in amplifying the adult heart tones for audiences up to several hundred.

Experiments were conducted with general electric U V 201-A and C 301-A amplifying vacuum tubes in makeshift amplifiers, using several types of commercial audio-frequency amplifying transformers.

It was found that a two stage amplifier of this type gave sufficient response to adult heart beats for detection in a head set or Western Electric loud speaker. A five stage amplifier gave a distinct response in considerable volume to the foetal pulse, and it could be readily counted several feet from the loud speaker.

### Steinach's Rejuvenation Operation.

WALKER and Lumsden Cook deal with this subject in the *Lancet* of February 2, 1924. Other workers had shown that ligation of the vas produced a state of heightened sexual vigour in young animals, but Steinach was the first to suggest that senile animals might have their sexual functions restored.

In carefully observed rats which had begun to show definite signs of senility the performance of bilateral ligation of the vas was followed in two to four weeks by renewed sexual and physical vigour which continued for as long as five to seven months. At the end of this time rapid failure of sexual powers and of general vigour followed, so that within a few weeks the animal sank into a state of apathy and died. The changes which were found in the testicles of the animals consisted in the atrophy of the seminal epithelium and

an increase in the interstitial tissue. It is curious that the atrophy of the seminal epithelium is not permanent, regeneration occurring after an interval of a few months. The animals experimented on lived longer than the controls, the increase in age being such that it would represent several years of life in the case of the human being if his life were prolonged in the same proportion.

The results hitherto obtained in human beings are not easy to estimate, they have been extremely capricious and it is not possible to claim that benefit either to the general health or to the sexual vigour will follow in any given case from the operation.

Definite benefit appears to have resulted from the operation in one out of three cases of paralysis agitans.

It is a pity that the operation has been so widely canvassed by the general public, if it had been allowed to remain in the hands of competent and sound surgeons for a few years it is likely that it might have been found to have considerable value in certain conditions. It has fallen to a large extent into the hands of quacks and the result is that any surgeon who is jealous of his good name and reputation will hesitate to have anything to do with it, in consequence the profession may be deprived of a valuable addition to its armoury.

### A Discussion on the Treatment of Acute Primary Infections of the Hand

(*Brit. Med. Jour.*, Dec 1, 1923, p 1025)

D. P. D. WILKIE, OBE., MCH. FRCS (Edm.), Assistant Surgeon, Edinburgh Royal Infirmary, stressed the importance of this subject, whether viewed from a medical or from an economic standpoint. No cases present more difficult problems for decision, and not infrequently the life of the patient may depend on the line of treatment which is adopted.

The introduction of pathogenic micro-organisms into the tissues is followed by certain reactive changes, both general and local. The response by fever with its heightened metabolism, the increase in the circulating phagocytes in the blood stream, and the production of antibodies we recognize as part of Nature's effort at protection. At the seat of infection we find a reactive hyperæmia, an outpouring of lymph and an aggregation of phagocytic cells—a local endeavour to destroy or wall off the invading germs and prevent their entrance into the blood stream. We regard these changes as protective, and we endeavour to aid and to reinforce them. In the hand in particular the outpouring of lymph and the death of many of the phagocytes is apt to lead to an accumulation which, in certain areas, is limited as to available space, so that dangerous tension may ensue and the vascular supply and the vitality of the part may be threatened.

The sphere of active surgical interference is the provision of drainage of such areas of suppuration and tension, and that before irreparable damage has occurred.

Two main types are met with—the one the lymphatic, the other the suppurative infection.

#### *In Lymphatic Infection*

The life of the patient is seriously threatened. The infection, usually gaining entrance by a prick or scratch leads within a few hours to a local congestion, associated with red lines up the arm, some swelling of the axillary lymph glands, and definite constitutional symptoms characterized by a rigor, rise of temperature, and malaise. The infecting organism is almost invariably the streptococcus, and the danger of septicæmia is a very real one.

#### *Suppurative Cellulitis*

May occur in any part of the hand, but there are two situations where it is specially liable to arise and where its early recognition is particularly desirable.



One is in the tip of the finger, where the dense, unyielding fibrous septa may confine pus under tension and lead to extensive necrosis of soft parts and bone. The other is deep in the palm of the hand, where, encased by the dense palmar fascia in front and by the bones and interossei muscles behind, the pus may accumulate under tension until forcing its way along the lumbrical canals, it appears at the roots of the fingers.

#### *Treatment*

The worst infections of the hand usually start from small and trifling lesions, hence the importance of prophylaxis in the shape of prompt antiseptic dressing of all wounds.

#### *Treatment of Acute Lymphatic Infection*

No incision must ever be made at the point of infection in such a case during the early stages. Premature incision will increase the risk of septicaemia. The principles of treatment must be to diminish absorption, to aid local resistance, to combat toxæmia, and, if possible, to give passive immunity. We encourage, therefore, hyperæmia locally by moist, hot applications produce passive hyperæmia and delay absorption. By applying Bier's elastic bandage to the upper arm give fluid in large quantities by the mouth or rectum, and inject a large dose (50 ccm.) of polyvalent antistreptococcal serum subcutaneously. In most instances no incision is ever required, but in an infection starting as the lymphatic type we may have secondary involvement with suppuration of the cellular spaces and tendon sheaths of the hand, when active surgical interference will be called for.

#### *Treatment of Suppurative Cellulitis*

Early incision with free drainage is always indicated. In the finger pulp two lateral incisions will completely relieve tension and if made in time, will save the phalanx from necrosis. For deep suppuration in the palm an incision is made in a cleft between two fingers and a sinus forceps thrust in along a lumbrical canal. If this gives inadequate drainage the web of the finger may be split up into the palm. For suppuration in the thenar space through-and-through drainage of the first interosseous space is essential. Incisions on the dorsum of the hand are very seldom required, for the swelling of the dorsum rapidly subsides when the palmar collection is drained.

#### *Treatment of Nail-fold Infection*

In the severe cases it may be necessary to throw up the nail-fold by a lateral incision at either side and remove part of the nail. As a rule however the pus will already have made its way out under the fold. The essential for rapid healing in such cases is to pack in strands of gauze between the nail and the fold by means of the blunt end of a straight sewing needle. This method is one of the most useful and successful devices of minor surgery.

#### *Treatment of Infective Teno-synovitis*

Free incision with adequate drainage is necessary at the earliest moment possible. For this, as for the operative treatment of all extensive hand infections, a general anæsthetic should be administered, otherwise inadequate drainage is all too likely.

The opening of infected tendon sheaths should err on the side of completeness, and no thought of subsequent scars should hamper one in providing the freest drainage.

#### *After-treatment*

Moist dressings and hot saline baths for the first few days should be the rule. They should be stopped, however, as soon as the acute inflammation has subsided, otherwise the tissues become soft and sodden, and resolution is delayed. In the case of cellulitis, rest should be instituted until the infection shows patent

signs of becoming localized. Thereafter the sooner movement is encouraged and persevered is the better.

### **Modern Optical Methods in the Examination of the Eye.**

(*Brit Med Jour*, Jan 5, 1924, p 8)

IN an address given at Birmingham to the Midland Medical Society, on November 28, 1923 Dr T. Harrison Butler, M.A., M.D., Surgeon, Birmingham and Midland Eye Hospital, described some of the modern and improved optical appliances which enable us to examine an eye under vastly increased magnification and to make our diagnosis directly from the appearances. He reminds us that the ophthalmoscope was first invented by Babbage an English physicist, in 1847. He gave it to Wharton Jones to try, but unfortunately this ophthalmic surgeon failed to appreciate its value. As a result, Helmholtz, who described and used an ophthalmoscope, in 1851, has obtained the credit for the invention of the ophthalmoscope.

During the past decade the self-lit electric ophthalmoscope has been developed and we now possess a very satisfactory instrument. The best is that manufactured by Messrs Curry and Paxton. It has a more powerful light than the majority and it is whiter in character and contains less red light. With the self-lit ophthalmoscope examinations of patients in bed can now be made with ease in full daylight.

In 1910 Gullstrand invented his reflexless ophthalmoscope. A beam of light furnished by a nitra-lamp is projected into the eye and the illuminated fundus is observed with a telescopic type of eye piece. A very high magnification can be obtained, and if the binocular eyepiece be used the fundus is seen in relief stereoscopically. The ophthalmoscope is very expensive and is an institution instrument valuable chiefly for teaching.

In 1911 Gullstrand invented the slit-lamp and at once opened a new chapter in ophthalmology. Used in conjunction with Czapski's microscope, this instrument has provided an entirely new field of research—the microscopy of the living eye. The slit-lamp does not in any way replace any of the older instruments and methods. It supplements them all to such an extent that first-class modern ophthalmology cannot be carried out without it. The instruments are made by Zeiss. The minimum outfit costs £65.

The slit-lamp consists of a system of lenses which projects from a nitra-lamp a ribbon of light that can be accurately focused upon any part of the eye. The light passes through a slit which can be adjusted to supply a ribbon of light of varied width. The lamp is mounted on an arm attached to a table in such wise that the light can be projected from any desired angle. The table has a glass top in which we place the Czapski's microscope. There is a chin and head rest for the patient. The microscope is a binocular with paired objectives and eyepieces and gives stereoscopic vision. The magnification with three objectives and a series of oculars ranges from  $\times 9$  to 100. The practical magnifications are  $\times 9$ , 25 and 35, 25 is most frequently used. With the higher powers the slightest movement on the part of the patient defeats the observer.

The slit-lamp not only enables us to employ high magnification and new methods of illumination, but it also introduces an entirely new principle—the examination of an optical section of the eye as far back as the first third of the vitreous.

There are four methods of illumination. The light can be focused directly upon the object in the cornea, iris lens or vitreous—direct focal illumination. It can be directed upon the iris in such wise that it is reflected back through the cornea, which can then be examined in a negative field—dark background illumination by transmitted light. Similarly the pupillary margin of the iris can be seen by light reflected back from the lens. Another method is to examine directly in the

mirror of light seen when the patient looks between the axes of the lamp and microscope. This shows up the corneal endothelium, which is seen as a mosaic of hexagonal cells.

Dr Butler describes the methods of employment of the slit-lamp and microscope and shows how it gives greatly increased powers to the ophthalmic surgeon.

When the beam is thrown into the eye obliquely it illuminates a prismatic section of the cornea and of the lens. If the ribbon of light is made very thin this is in effect an optical section. The section of the cornea magnified twenty-five times is two centimetres thick and enables opacities and alterations to be accurately localized.

### The Effects of Cold-Storage on *Taenia*-infected Meat.

THE cold-storage of meat supplies is a problem which is becoming of increasing importance in India, and a memoir on the above subject by Dr Annie Porter, D.Sc. (Lond.), Parasitologist, South African Institute for Medical Research, Johannesburg,—being No. XVI of the publications of that institute,—will be of interest to sanitarians in India. It has been assumed that three weeks' freezing of meat infested with tapeworm cysts is sufficient to destroy the vitality of the cysticerci and to prevent their development in man. But what are the actual facts?

The investigation dealt with the effects of continued cold on the viability of the cysticerci of *T. solium*, *T. saginata*, and *T. crassicolis*, and on the echinococcus of *T. echinococcus*. It was found that the most satisfactory test for viability of *Cysticercus bovis* and *C. cellulosae* was by staining by methyl green slightly acidulated with acetic acid, when dead cysticerci stained deeply and rapidly. As judged by staining reactions, cysticerci and echinococci frozen for short periods retained their vitality, whilst the administration of meat containing hydatids of *T. echinococcus* frozen for from 30 to 70 days to clean laboratory bred dogs resulted in infection. Freezing for a month failed to destroy the vitality of *C. fasciolaris*, deep-seated cysticerci remain alive after freezing when superficially seated ones are killed, and cysticerci protected by fat especially escape. Exposure for some ten weeks to temperatures of  $-5$  to  $-18^{\circ}\text{C}$  destroyed the vitality of all the cysticerci in beef and pork, but for safety a period of 12 weeks at  $-10^{\circ}\text{C}$  is suggested.

On the other hand the nutritive value of meat so frozen may be doubted, and the author advocates the German pre-war Freibank system. In this all heavily "measled" carcasses were condemned for human consumption, and were utilised for tallow and similar products, lightly infected meat was treated, the infected portions removed, the meat frozen for three weeks and then sold at a reduced rate under the name of "spoiled meat." It is obvious that in India at least special care and precautions will have to be taken, and—in view of the prevalence of these infections in Indian meat—exposure for ten weeks to  $-10^{\circ}\text{C}$  appears to be essential.

### International Industrial Hygiene

THE December, 1923, *Bulletin of the Industrial Hygiene and Safety and the International Labour Organisation, Geneva* (Series F Industrial Hygiene, No. 9) contains papers read at the Conference of this organisation at the Royal Sanitary Institute in London, last June. Industrial hygiene is to-day in a very elementary stage in India, although legislation is feeling its way towards the necessary enactments, civil surgeons and medical men in many industrial areas are awakening to its needs, and a few pioneers—such as Miss Curjel—have investigated the problems of female labour in Indian industries.

Lieutenant-Colonel J. A. A. Pickard outlines the organisation of the "safety first" movement in British

industries, and the steps needed to prevent accidents,—accidents which are far more frequently the result of the carelessness of individuals than of faulty machinery. Here what is needed is an educational campaign, the average Indian *mistri* for example takes risks which no European bricklayer would run, trusting to the symbolic basket which he ties at the top of his crazy scaffolding to protect him from harm. The B. I. S. F. A. accident prevention service provides such inspection and instruction, and in three years work has reduced the accident compensation paid by various industrial concerns by more than 40 per cent, at a cost of less than 1/- per employee per annum. Mr. Stevenson Taylor deals with the technical details and legislation for the safeguarding of industrial machinery, and Mr. D. R. Wilson, with the study of industrial fatigue. Here are outlined the important results gathered together by the Industrial Fatigue Research Board of the Medical Research Council of the United Kingdom in 1918 and subsequent years. He pleads especially for wide and international effort in the study of such problems.

Dr. T. M. Legge, C.B.E., M.D., deals in a most interesting address with industrial diseases and injurious processes. Some of the examples quoted are both startling and novel. Thus he records that during the war, a submarine of a particular pattern returned to port after a rather prolonged submersion with the whole of the crew suffering from curious symptoms ascribable only to poisoning with arseniuretted hydrogen. Traces of arsenic having been found in the acid used in the batteries used for motor power when the submarine was submerged, this was replaced with arsenic-free acid, but, conditions continued the same. It was finally found that there was 0.2 per cent of arsenic in the lead plates used in the batteries of the vessel, and arsenic-free lead plates had to be installed in this whole class of submarine at considerable expense. A second good example detected was poisoning by the inhalation of dust in a blast furnace employed in the manufacture of ferro-manganese.

In the final paper in the *Bulletin* Miss Constance Smith, O.B.E., deals with the conditions of female labour in British industries.

Problems similar to those dealt with in this report exist in India, though they have hardly as yet been even studied. A good example is that of jute workers' dermatitis, as studied by Acton and Curjel. Here, in the retting of jute, the workers' arms are immersed for hours in the preparation baths, and if not properly washed with soap and water, an acute seborrhoeic dermatitis may supervene,—a dermatitis very easily prevented by the free use of soap and water. Ankylostomiasis whilst hardly an industrial disease *per se*, has wide industrial bearings in the matter of the efficiency of labour. The plea for international co-operation in the study of such subjects and in the introduction of legislation for them may seem Utopian, but is none the less necessary.

### The Deccan Medical Journal.

MEDICAL journalism in India is so often represented by examples of how not to do it, that it is pleasant to come across a really well run and interesting journal. *The Deccan Medical Journal*, published quarterly, is the official organ of the Hyderabad Medical Association, and appears with a cover recalling that of the *Practitioner*. The number for January 1924 is a special children's number, and among other interesting articles, is one on enteritis in children by Dr. A. L. Sayeed, M.B., B.Ch. (Edin.), one on congenital hypertrophic pyloric stenosis by Dr. H. Hyderali Khan, F.R.C.S. (Edin.), and an interesting note on the use of an indigenous Indian drug—the seeds of *Pongamia glabra*—for whooping cough.

The paper, printing and general get-up of the journal are of a high order, and represent something rather exceptional in Indian medical publications. The journal is edited by Dr. Hyderali Khan, Afzulganj.

General Hospital, Hyderabad, Deccan, and the annual subscription is Rs 5

### Brief Notes

*Dosage of Quinine in Infants*—Nogue and his colleagues advise giving 7½ grains daily of quinine bihydrochloride on the first three days of treatment of pernicious malaria in infants of one year old.

*Quinine Intolerance*—Abrassart reports a case in which prostration, fever, a measly rash and general erythema of the skin followed a dose of 25 cgm of quinine by the mouth. The symptoms lasted three days. A month later a more severe attack lasting 7 days followed the use of a similar dose.

Broden advises desensitization in quinine intolerance, by giving 1 cgm daily for 2 days, then increasing the dose by 1 cgm every third day till doses of 40 cgm are reached.

*Treatment of Guinea Worm by Emetine*—Le Dentu claims good results, especially in the disappearance of inflammation, but the worms were not always killed.

*Arsenicals in Amoebic Dysentery*—Following the example of Ravaut, various French workers have used novarsobenzol in the treatment of amoebiasis. The dose employed is 0.3 gm every four days alternately with emetine. Nogue and Leger claim to have cured two out of three cases of acute amoebic dysentery by tablets of 0.25 gm of stovarsol.

*Anti-Plague Vaccines by the mouth*—Leger and Baury are working on this subject, employing the method with preliminary bile treatment.

*The Cause of Low Blood Pressure among Orientals*—The Journal of the American Medical Association refers to the work of McCay in Bengal and Cadbury in Canton. Both these observers find that the systolic pressure is considerably lower in Bengalis and Chinese than in Europeans. The factors suggested are smaller stature, lower body weight, vegetarian diet with an associated absence of intestinal stasis and intoxication.

## Reviews

**HISTORY OF THE GREAT WAR MEDICAL SERVICES. GENERAL HISTORY VOL II—**  
By Major-General Sir W. G. MacPherson,  
K.C.M.G. London: His Majesty's Stationery  
Office, 1923. Pp. 510. Price 21s net.  
Obtainable from Messrs Thacker, Spink  
& Co., Calcutta.

THIS volume details the history of the medical services on the Western front and during the operations in Belgium and France in 1914 and 1915, the previous volume of the same series having been concerned with the Home organisation in the United Kingdom. It is a volume which is almost incapable of review, since the information contained is so voluminous and so detailed. It is nevertheless one which will command the closest attention from all administrative military medical officers.

The campaign on the Western front was characterised by one all-important matter, whereas sickness was often of relatively little importance, the number of wounded to be dealt with was unparalleled in any previous campaign, and what at the commencement, was essentially a skeleton service, expanded so rapidly that at one period, we read that less than ten per cent of the medical and nursing personnel with the British forces in France belonged to the regular R.A.M.C., and that, despite the enormous enlargement of that Corps, faced with a tremendous demand for the collection, first aid treatment and rapid evacuation of immense numbers of wounded, arrangements had to be made, which were at first extemporary in character,—but which later led

to new conceptions and to new organisations. As far as we can gather from this volume, matters during the retreat from Mons were not so very far different from conditions in 1914 in Mesopotamia, what there was of medical personnel and equipment was excellent, but it did not go half far enough. During 1914 the field medical units dominated the picture, but by degrees motor ambulances supplemented and replaced horse ones, the clearing hospitals became largely transformed into casualty clearing stations, and by degrees, with the enormous numbers of casualties present on battle-fields of limited width and depth, strategical employment of different units, elasticity by which personnel could be at once collected to supplement that locally available, and larger medical formations became essential.

The volume therefore deals essentially with a transitional period, and is full of very detailed information, supplemented by numerous excellent photographs and maps. Every here and there we get intimate personal touches,—extracts from official and private diaries of medical officers in charge of small units. But on the whole the volume makes difficult reading, as is inevitable from the nature of its contents.

A chapter which will especially interest readers in India is Chapter V, which deals with the medical services with the Indian contingent. Here, between the lines of official and documentary evidence, one can read a story similar to that in Mesopotamia. What there was, was good, but provision for emergencies was on a wholly inadequate scale. At first it was contemplated to evacuate sick and wounded through the sea-base at Marseilles to Egypt, and so to India. But hospital ships and base personnel were wanting, and everything had to be supplemented from British sources—men, personnel, equipment, medical comforts. Finally it became evident that special Indian bases would have to be established in Great Britain, and the Indian hospitals at Brighton and elsewhere were opened. Both Lahore and Meerut Divisions left France at the end of 1915 for Mesopotamia, whilst the Indian Cavalry Corps became absorbed in 1916 into other cavalry divisions.

The careful reader will find in this volume a wealth of information on military medical matters which he cannot ignore. To give but a single instance, in one matter at least foresight had been used. The original Expeditionary Corps carried with it some hundreds of the Brechet apparatus, a light and portable iron framework which could be erected in any railway wagon, in pairs, and which would then accommodate three stretchers with lying down cases, thus making it a simple matter to convert a train of cattle trucks into a fairly comfortable ambulance train. But for this and for details of how the many emergencies were met until finally the British medical organisation was perhaps first among those of all the combatant nations, we must refer the reader to the original volume. The book is one which deserves careful and detailed study, despite its highly technical and sometimes heavy style.

**FIFTY YEARS OF MEDICAL PROGRESS, 1873-1922—**By H. Drinkwater, M.D. (Edin.)  
London: H. K. Lewis & Co., Ltd. Pp. XXII  
+184. Price 10s 6d net.

THIS little book of 184 pages contains a vast amount of interesting information arranged in such a way that it is very readable and easy of reference.

Unfortunately there are many inaccuracies, for example the account of the discoveries of Ross is quite misleading and the information regarding relapsing fever deals only with the tick borne form of the disease, even the name of the carrying tick is incorrectly spelled.

As an entertaining story of the achievements of medical scientists it is an excellent book, as a reliable source of accurate information it is seriously defective. The portraits of celebrated medical scientists form an attractive feature of the book, but it is hard to understand why such giants as Koch, Ehrlich, Laveran, Manson, Pasteur and Lister should not find a place,

while a number of minor workers have been included. It is also surprising that Mendel should occupy the place of honour in the frontispiece, in spite of his remarkable contributions to biological science.

**THE PREVENTION OF DENTAL CARIES AND ORAL SEPSIS.**—By H. P. Pickerill, C B E., M.D., Professor of Dentistry in the University of Otago. 3rd, 1923, edition. London: Bailliere, Tindall & Cox. Pp. xii + 340. Price 18s.

THIS is a most suggestive book which should be studied by all who desire to understand the causation and prevention of dental caries. Details of important experimental work are given, and in addition a critical survey has been made of diatetic habits of the races which are least affected by dental caries. The importance of a varied and "tasty" dietary is stressed, and the conclusion is reached that each meal should be concluded by eating some acid fruit or vegetable. A plea is made for the teaching of oral hygiene in the lay and medical schools. A valuable addition to the book would be a summary of the methods of dental toilet which are recommended. These have to be inferred from the conclusions stated at the end of each chapter. The fact that the book has reached a third edition and that it has been translated into German and Japanese, shows that it is a serious contribution to a very important and difficult subject.

**LECTURES ON HOOKWORM DISEASE.**—By Lakshminarain Raj, L.M.S. (Cal.) Printed by D. C. Chunder, 42-1, Bowbazar Street, Calcutta, 1923. Pp. 59. Price Rs. 2.

THIS little book has been published at the request of the medical men who attended the special lectures delivered by Dr Lakshminarain Raj, on completion of his investigations on hookworm disease in the United Provinces. Five years have elapsed since the lectures were delivered, and it is a pity that they were not published when they were written.

Apart from the advances which have been made during these years, the lectures form an interesting and reliable resume of our knowledge of hookworm disease. The author had the benefit of a course of instruction by Colonel Clayton Lane and it is evident that he had profited very fully by his opportunities.

The book will be found useful to all isolated medical men who desire to diagnose and treat their cases of hookworm disease on scientific lines.

**THE HEART IN MODERN PRACTICE, DIAGNOSIS AND TREATMENT.**—By W. D. Reid, A.B., M.D., Chief of Heart Clinic at the Boston Dispensary, Assistant Visiting Physician and Member of the Heart Service, Boston City Hospital. J. B. Lippincott Company, Philadelphia and London, 1923. Pp. 352. 32 Illustrations. Price 25s. net. Obtainable from Messrs. Butterworth & Co. (India), Ltd.

THIS book incorporates the best of the new knowledge gained by the introduction of graphic methods of examination of the heart in health and disease, with that less recently acquired but which has stood the test of time. It will be of great value to the busy practitioner and to the student, as there is not a single book in English which incorporates such extensive advances in one volume. The book consists of five sections and an appendix with interesting illustrative case reports. Section I deals clearly with the anatomical, physiological and clinical aspects of the cardiac mechanism. Sections II, III and IV describe the ætiological aspects, functional conditions and structural lesions respectively in heart disease. The chapter on cardio-vascular syphilis illustrates the methodical way in which the various aspects of syphilitic affections of the heart has been tackled. Section V deals with modern methods of treatment.

**A TREATISE ON INFLUENZA.**—By Rajendra Kumar Sen. Calcutta: Butterworth & Co. (India), Ltd, 1923. Pp. 150. Price Rs. 3-8.

THIS little book may be found useful by those called upon to face an influenza epidemic. It culls information from many different sources, and is a compendium upon the disease. One of the best chapters is a historical review of the pandemic of 1918. The account of treatment is full and is illustrated by numerous prescriptions. Prophylaxis and vaccine therapy are commented on, though the chapter on morbid anatomy leaves much to be desired, as the author fails to note the frequency of acute oedema of the lungs which was so marked a feature of the recent pandemic. The book, however, may prove useful to both medical students and general practitioners.

**THE MEDICAL YEAR BOOK, 1924.**—Edited by C. R. Hewitt. London. William Heinemann (Medical Books), Ltd. Pp. 591. Price 12s. 6d. net.

THE object of the Medical Year Book is to provide a handy volume conveniently arranged and classified, and intended to serve as a guide to the current activities of the profession in the United Kingdom. The book contains an extraordinary amount of useful information, and is very well arranged. In addition to lists of London and provincial hospitals, medical schools, consultants and specialists, information is provided in a concise style relating to medical examinations, fees and the cost of medical education, the official medical and public health services, post-graduate courses, degrees and diplomas, medical journals in the British Empire, whilst a short series of articles dealing with insulin, chemotherapy, cancer and the profession of medicine help to render the volume up-to-date.

In brief the book is a sort of medical Whitaker's Almanac and will be found invaluable for reference.

**THE FORM AND FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM, 2ND EDITION.**—By F. Tilney, M.D., Ph.D., and H. A. Riley, A.M., M.D. New York: Paul B. Hoeber, 1923. Price \$12.00 net. Pp. 1019.

THE volume under review is probably the most complete presentation in a single work in the English language of the physiology of the brain in relation to clinical medicine.

The book aims at incorporating a knowledge of the anatomy and physiology of the central nervous system in the teaching of the diagnosis and treatment of disease. With this end in view anatomical and physiological facts are illustrated whenever possible by clinical examples, and actual cases are quoted to elucidate the functions of the brain and the spinal cord. This blending of anatomy and physiology with clinical medicine can only have the happiest results.

The plan indicated in the title is adhered to throughout in the treatment of the subject in hand, viz., a description is first given of the "form" of the central nervous system including macroscopic and microscopic details, embryology and comparative anatomy, the functions of the part under discussion are then taken up and the disturbances due to organic defects illustrated by actual cases.

The various syndromes connected with disease of anatomical and physiological entities are described and discussed.

The views advanced in most cases are those which are generally accepted. In a few cases, where our knowledge is deficient, theories are advanced as working hypotheses, especially when such have the support of clinical experience. This, the authors state, is done with a view to "avoiding confusion for the student and in the hope of stimulating further investigation."

The book is profusely illustrated, the majority of the illustrations being original. Those of the tracts of the spinal cord are particularly helpful.

We have no hesitation in saying that this *magnum opus* should find a place on the bookshelves of every neurologist and physiologist.

**THE CEREBRO-SPINAL FLUID IN HEALTH AND DISEASE**—By Abraham Levinson 2nd, 1923 edition. St. Louis: C V Mosby Co Pp. 267. Price \$ 5 00

THE second edition of this work on the cerebro-spinal fluid has just appeared, the first having been published in 1919

It constitutes a very comprehensive treatise on the cerebro-spinal fluid, dealing first of all with the anatomical and physiological factors concerned in its production then with its various properties, physical chemical and physico chemical with its variations under pathological conditions and terminating with a chapter on the intra-spinal administration of remedial agents

The third chapter deals with the practice of lumbar puncture, and in it there is a useful discussion of technique with elaborate tables giving the measurements of needles by which fluid is obtained in children and adults

In the section on suspected pathological cerebro-spinal fluid and its examination the description is excellent The Lange gold chloride test is preferred to other similar ones including Guillain's "Reaction du Benjoin Colloidal" The last seems to be discussed rather shortly

The author throughout has not only given a complete survey of the literature dealing with this subject but has been able to put forward much of value gleaned from his own extensive experience The book is one which will be of great service to clinicians and laboratory workers who have to deal with cases demanding examination of the cerebro-spinal fluid

The work is well produced and illustrated and each chapter has a full list of references to the literature on the subject treated in it

**THE TREATMENT OF CHOLERA**—By Arun Kumar Mukherjee, MB, Late House Physician of the Cholera and Kala-Azar wards, Medical College, and Assistant Research Scholar in the Calcutta School of Tropical Medicine Published from 23, Bethune Row, Calcutta Price Re 1.

THIS little book written in plain simple Bengali, contains all the information required for the modern treatment of cholera It will be of value to the village practitioners for whom it is mainly meant Treatment is fully dealt with in a most practical manner and from a wide experience The chapter on prevention is very useful

**MULTIPLE SCLEROSIS (DISSEMINATED SCLEROSIS) VOL II (1921).**—By the Association for Research in Nervous Diseases U S A Published by Paul B Hoeber New York Price \$ 3 75 Pp 241

THIS book consists of a report of discussions on the subject of disseminated sclerosis by leading American neurologists and one of the most valuable features is a summing up of the facts and opinions by a select commission The conclusions of the commission regarding general considerations do not contain much that is different from the orthodox teaching, but the following interesting findings may be mentioned.

The disease is especially common in the region of the great lakes of the United States and in the northern parts of Europe as compared with other parts of America and Europe

It has no connection with syphilis, nor with infantile infections and it is not inherited

The conclusions regarding the symptoms are of special interest. The triad of Charcot—viz, nystagmus, intention tremor and scanning speech,—are not necessarily present The onset as a rule is insidious, remissions are common and important, so much so that the earlier

symptoms may be overlooked and may entirely disappear for a time Weakness and stiffness of one or both legs, gradually going on to spastic paralysis or other upper motor neurone paralysis, is the rule Increase in knee jerks is nearly always present and there is nearly always loss of the abdominal reflexes Nystagmus occurs in about 70 per cent of the cases Babinski's sign is usually present, tremors occur in about half of the cases, usually of the extremities but sometimes also of the head, ataxia occurs in rather less than half, remissions, bladder symptoms and disturbed speech occur in about 40 per cent of the cases Facial palsies, spastic gait, temporal atrophy of the disc sensory changes and a history of diplopia were noted in about one-third of the cases Mental changes are comparatively uncommon, occurring in less than 20 per cent of the patients

The cerebro-spinal fluid and blood show no special changes the Wassermann reaction being uniformly negative

The disease often appears as a spastic paraplegia and it may be years before the occurrence of ocular signs reveals the true nature of the case The occurrence of remissions may be the only means of distinguishing the disease from amyotrophic lateral sclerosis

Multiple cerebro-spinal syphilis often closely simulates the disease and the presence of ocular palsies in syphilis and the serum reactions of the blood and cerebro-spinal fluid are of great assistance in the differential diagnosis The pupil reactions are usually normal in disseminated sclerosis and the spasticity is much less in the early cases than in syphilitic sclerosis

The prognosis as regards life is not unfavourable in most cases but complete recovery is practically unknown The difficulty in making a diagnosis in certain cases and in most of the early cases is emphasised Treatment is chiefly symptomatic

In connection with the pathology there are two divergent schools of thought the one regarding the lesions as purely degenerative whilst the other looks on them as being the result of previous inflammatory changes and the commission does not attempt to state a definite conclusion nor does it express an opinion regarding the bacteria which have been reported to be present by some European workers Undoubtedly the book represents the most valuable document in existence on disseminated sclerosis, and, while it does not pretend to solve the problem of the disease, it states the ascertained facts in such a way as to clear the way for further work There is no reliable information as to the frequency of the disease in India, though there is a strong general impression that it is much less common than in European countries Until we have special clinics for nervous diseases in India it is hopeless to express definite views on the relative frequency of this and other chronic sclerotic diseases in this country Such centres as Calcutta and Bombay should certainly have special hospitals or at least special departments for the study of nervous system diseases by the establishment of these a higher standard of diagnosis would be attained and it is likely that fresh light would be thrown on the whole subject by obtaining accurate information on the relative frequency of the occurrence of the various nervous diseases under the conditions existing in this country

This volume is of great value not merely from the light which it throws on the subject, but still more as a stimulating lesson in the methods of research in nervous diseases as a whole. Every physician in India who has to handle cases of disease of the nervous system should certainly study this illuminating book

**THE PRIMARY PROBLEMS OF MEDICAL PSYCHOLOGY.**—By Dr Ch De Montet Translated by A Newbold London: John Bale, Sons & Danielsson, Ltd 1923 Pp. 142. Price 7s 6d net

IN his introduction the author begs the reader to follow his reasoning to the end before criticising his suppositions On the whole this request is well-timed

because the book, although extremely interesting in places, makes very dull reading. This is partly due to a want of better arrangement and partly to the author's incapacity to express himself clearly. At times it is by no means easy to follow him. We agree thoroughly with Dr De Montet that psychology "is still deeply steeped in mythological and scholastic thought." Nevertheless, there is no reason for psychologists, especially medical psychologists, to be so pessimistic about their particular science as Dr De Montet would appear to wish them to be. The very essence of progress and development in any branch of knowledge lies in the maintenance of fluidity in the ideas associated with it. Indeed, so far from there being at present any very widespread tendency towards a suspension of opinion, there is on the contrary, a perfect clamour for cut-and-dried knowledge and irrevocable definitions. We admire the author for his enthusiasm for a comprehensive reconciliation of the results obtained by the various schools of thought, and we are thoroughly in agreement with him in his opinion that it is indispensable to find a hypothesis which embraces these diverse manifestations of life without contradiction. All the same we cannot see that the author's conception of the mutual dependence of all phenomena in conjunction with his own definition of consciousness, gives us the solution of this very difficult problem. As far as one is able to judge the author takes his stand on the Procrustean hypothesis of Brentano, (*Psychologie vom empirischen Standpunkte*), that relation to an object is an ultimate irreducible characteristic of mental phenomena, an assumption which is open to very serious objections. To illustrate his belief in the interdependence of the manifestations of the psyche, Dr De Montet considers a succession of what he terms "isolated impressions." He then passes on to a discussion of the relations between the soul and the body as well as between thought and action. The book concludes with a recapitulation which reads as follows: "The states of consciousness which we have described as 'isolated impressions'—whether they be the fixed ideas of a patient or the preconceived ideas of the doctor are an expression of the natural tendency to raise any fragmentary idea or caprice to a principle, making exceptions to rules that mean replacing facts by subjective opinions." The translator may be congratulated on having made a very excellent rendering into English of the original French.

**SOME COMMON SYMPTOMS OF AN UNSOUND MIND.**—By G. Rutherford Jeffrey, M.D., F.R.C.P.E. Messrs. H. K. Lewis & Co., Ltd., London. 1923. Pp. xviii+268. Price 7s. 6d. net.

THE author states in the preface that of "all the symptoms of mental unsoundness, altered conduct is one of the most constant." Presumably the author expects his reader to understand that the "alteration" to which he alludes connotes a change for the worse and not for the better. Throughout the book there is a regrettable lack of precision in the use of terms. Very few definitions are given, although it must be admitted that to define some of the terms employed is next to impossible. Nevertheless a book of this sort suffers in its utility if no attempt is made to explain what is meant by such expressions as "normal mind," "abnormal mind" or "irresponsible person."

The common symptoms dealt with are divided into delusions disorders of perception exaltation excitement depression mental confusion and altered conduct. As the existence of any of the first six "symptoms" involves an alteration in conduct of some description, it might have been better to have inverted the order of their discussion. However, the existing arrangement makes no material difference.

There is a good deal that is worth reading on delusions, although one might be prepared to combat his view that a single delusion could ever be of such a kind as to warrant it being regarded as "of diagnostic importance."

The author states that the delusions which occur in chronic alcoholism are "invariably of a sexual nature." It would probably be more in accord with our present knowledge of this subject to have written "usually" instead of "invariably."

We are informed that "simple melancholia" as a rule results from some definite cause. This statement is probably true of any disease, hence it is not very helpful in respect to the ætiology of "simple melancholia." Here again the author would have been nearer the truth had he written that melancholia nearly always results from some sexual conflict.

It is to be feared that the author overestimates the degree to which persons suffering from any mental disease are dangerous to others, for he goes so far as to state that "a person of unsound mind is the victim of a disease which at any moment may make him a source of danger to others."

The question of making a mental disorder a notifiable disease is discussed without any definite conclusion being reached.

The book is dedicated to Sir James Crichton Browne who has written a foreword to it. The index could be made a great deal more useful by enlargement.

**MENTAL DISORDERS.**—By Francis M. Barnes, M.A., M.D. C. V. Mosby Co.: St. Louis 1923. 2nd edition. Pp. 295. Price \$3 75

It is hard to say what section of the population this work is intended for. To the psychiatrist it brings nothing new, for the general practitioner its vagueness and want of finality render it useless as a "guiding light," and for the same reasons it cannot be commended to the educationalist, the legislator or the sociologist in India.

It has however much that can be said in its favour for those who take it as it is, for those who will look on it as emphasising old but too often neglected points, as bringing to their notice the "other side" of many recognised items of every day psychiatric practice. In other words one may say that for the psychiatrist with a few leisure hours on hand it might prove a pleasant companion. "Cauld kail het agen" is by no means a bad dish after a dry sermon, and many a Scotsman has thriven on it.

It deals with the subject in its various aspects in a methodical, orderly manner, but many of the chapters leave the reader with much the same feeling as one has when reading an exciting detective story and finding that the last two chapters are missing. In such a subject of course one cannot expect finality in every aspect of it but this lack of finish is painfully present in most chapters.

The arrangement of the book is excellent and the views and opinions expressed sound and logical on the whole, though the author is inclined to join the extremists as regards criminality and psychoses and one feels that if he had his way jails would be abolished, the word "bad" scrapped from the dictionary, whilst hospitals and "mad" would be the resultant substitutes. With society as it is, such a contingency is remote indeed and if the deterrent effect of punishment were removed crime would increase by leaps and bounds.

The treatment of the preventive aspect of the subject is very sound and it is a pleasure to see due weight being given to the physical side of such conditions and the Freudian School being noted merely as a matter of history.

The classification adopted is much on the same lines as that of Bruce, one which will be of use to the general practitioner, giving him some clue as to cause and the lines of treatment to adopt. As we have already noted however, it is not in our opinion likely to prove a useful book of reference for a busy medical man.



**DISEASES OF THE RECTUM, ANUS AND COLON, INCLUDING THE ILEO-COLIC ANGLE, APPENDIX, COLON, SIGMOID FLEXURE, RECTUM, ANUS, BUTTOCKS AND SACRO-COCCYGEAL REGION:—**By Samuel Goodwin Gant, M D, LL D, Professor and Chief of the Department for Diseases of the Colon, Rectum and Anus at the Broad Street Hospital, Graduate School of Medicine, New York City 3 Vols Pp 1616, with 128 illustrations and 10 Insets in colours W. B. Saunders Co, Ltd, London and Philadelphia Price £ 6-6-0 net

Up till recent years the diseases of the colon were regarded as exclusively belonging to the province of the physician, the surgeon being only called on to interfere in cases of obstruction and of malignant disease, whilst the rectal specialist confined his activities to the last few inches of the bowel. The advent of the electric sigmoidoscope has changed all this, it has demonstrated that ulcerative processes in the colon usually extend far down into the rectum, that in many cases persistence of symptoms is due not to colonic lesions, but to unhealed ulcers in the rectum and that the lesions in the latter region are more amenable to local treatment applied through the instrument than to general medical treatment.

Irrigation of the colon through an appendicostomy or cecostomy opening has long been recognised as a life-saving measure in cases which resist all other forms of treatment. The recognition of diverticulitis as a clinical entity and the increasing popularity of the abdomino-perineal method of excising rectal carcinoma are other instances of the tendency of the rectal specialist to extend his scope upwards. It follows that the artificial separation of diseases of the rectum from those of the colon must now disappear, the only rational method being to deal with them as a whole. The present work is an example of this method carried to extremes. Its three volumes total some 1,600 pages, and besides dealing with the diseases of the colon and rectum, include chapters on abdominal wounds and injuries, enteritis, the treatment of acute amoebic and bacillary dysentery, intestinal worms, ptomaine poisoning, diarrhoea in enteric and other fevers and in cholera, purpura hæmorrhagica, appendicitis and gastric and duodenal ulcer to mention only a few. That these diseases may cause symptoms resembling these due to diseases of the rectum or colon is undeniable, but that does not in our opinion justify the inclusion of brief unsatisfactory chapters on their pathology, symptoms and treatment.

Appendicitis for instance is dealt with in 8 pages, four of which are occupied by half-page illustrations, its symptoms are allotted half a page and the diagnosis a quarter-page, most of which is occupied with the description of radiographic appearances. The treatment of gastric ulcer and carcinoma occupies half a page, and an out-of-date table of the cultural reactions of the dysentery-typhoid group of bacilli appears in the section on dysentery. We could multiply instances of the inadequacy of these chapters but it suffices to say that in our opinion the book would gain by their complete elimination which would enable it to be reduced in size and price. Readers in search of information on these subjects will consult works on general medicine, which treat of them fully.

In its proper sphere however the book is admirable. The treatment of the subjects is exhaustive, perhaps too much so, in his striving after conciseness combined with completeness the author often sacrifices literary style and falls back on long catalogues of causes and symptoms which make heavy reading and convey no clear word picture. Operative technique is his strong point, his procedures many of them original, are lucidly described and are illustrated by an abundance of beautiful figures which bring out the steps of the operations with admirable clearness. A multiplicity

of ingenious instruments and "gadgets" of the author's own devising are described and figured, proving him to be a surgeon of vast practical experience with an inventive mind. Local anaesthesia is advised for the majority of rectal operations, major procedures being of course excluded, the technique of the injections is admirably illustrated and we must admit that, having personally tried these methods in several cases with success, we have been much impressed by the advantages of local over general anaesthesia in dealing with fissures, fistula and mild cases of hæmorrhoids. We note that he disapproves of the injection treatment of hæmorrhoids, holding that removal under local anaesthesia is superior in its results and causes no greater pain or after-trouble, a view with which we are inclined to agree.

Surgical opinion is still divided on the subject of the best methods of treating carcinoma of the rectum. Amongst English surgeons a preliminary colostomy is almost always performed, but this does not find favour with continental surgeons, nor apparently in America. The statistics quoted are all of German origin and the operations recommended are modifications of those in favour on the continent, aided by numerous ingenious devices of the author's own invention.

The chapters on constipation and intestinal stasis are interesting, but are unnecessarily lengthened by the inclusion of summaries of matters such as imperforate anus, stricture, etc., which have already been fully dealt with in earlier chapters. The concluding chapters on operations on the colon are noteworthy for the numerous beautiful illustrations, but these are a special feature of the whole work.

The printing, paper and get-up of the book are as good as they could be, but the price is so high that the work is one which will appeal only to the surgeon and specialist, who should find it a helpful work of reference.

**DISEASES OF THE RECTUM AND COLON AND THEIR SURGICAL TREATMENT:—**By P. Lockhart Mommery, F R C S (England), Senior Surgeon to St Mark's Hospital, London Pp 872 with 5 coloured plates and 215 figures in the text London. Baillière, Tindall & Cox, 1923 Price 25/- net.

This book is not a new work, but is a revision of the author's well known works on the rectum and colon, now combined into one volume and brought up to date. Our knowledge of diseases of the large bowel has advanced rapidly of recent years and the artificial separation of diseases of the rectum from those of the colon is now discarded by modern writers. The author of this book, who was himself one of the first English surgeons to work with the electric sigmoidoscope, has done well to put his new edition into this form and the result is a complete and handy monograph in which all recent work of importance is incorporated.

The opening chapter on anatomy emphasises by clearly drawn diagrams the important points in the distribution of the blood vessels and lymphatics of the bowel, on which the success of the modern operations for carcinoma depend. The chapter on the physiology of the large bowel summarises some interesting experimental work on peristalsis and meteorism, the conclusion that post operative meteorism is due to sepsis is one with which all surgeons will agree.

The chapter on examination and diagnosis is very clear and includes illustrations of the modern specula and directions for their use. The older types of expanding specula are nowadays superseded by more humane and efficient instruments. The sections on preparation for operation and antiseptic technique are particularly good, and it is gratifying to learn that the author has proved by bacteriological tests that asepsis can be secured in the rectum.

The various methods of producing local, regional and spinal anesthesia are described, but are not enthusiastically advocated the author admitting a preference in general for gas and ether.

The interesting condition of congenital megacolon is described at considerable length, but the author admits that no light has as yet been thrown on its actual causation.

He is an advocate of the injection treatment of hemorrhoids, but only in certain restricted cases. The ligature operation is advocated in preference to the more attractive modern excision operations, which in the experience of most surgeons do not give any better results. Whitehead's operation is deservedly condemned.

The chapters on adhesions, kinking and enteroptosis furnish a clear balanced account of modern views. The author regards weakness of the abdominal muscles as the main factor in the causation of enteroptosis and would discard all operations which aim at shortening mesenteries and fixing organs to the abdominal wall. His own operation for severe cases of intestinal stasis consists in joining the transverse colon to the sigmoid flexure, but he does not furnish sufficient details of his cases to enable us to judge the results.

In the chapter on proctitis we find an excellent account of the method known as cataphoresis, which is claimed to give better results than any of the older methods of treatment. On the subject of mucous colitis the author brings forward some interesting observations to prove that the condition is never a neurosis but that a definite pathological lesion can always be found if properly looked for.

There is a very good account of ulcerative colitis and its treatment, but we regret to notice the entire omission of all reference to the complications of amœbic dysentery, such as pericolicitis, perforation and abscess formation.

The operative treatment of malignant disease is very fully dealt with though many would disagree with the author's limitation of the abdomino-perineal operation to advanced cases. The accounts of these operations are very clearly illustrated.

In acute obstruction of the large bowel the procedure advocated is a "blind" cœcostomy, followed later by an exploration. There has been a good deal of discussion on this point lately, and the author's method has been both warmly advocated and sharply criticised. Into the merits of this discussion we do not propose to enter, we will merely remark that "blind" cœcostomy is an excellent procedure for the advanced cases of obstruction so often met with in India.

On the whole we consider this an excellent monograph which we can recommend both to practitioners and students.

**SURGICAL NOTES ON CASE-TAKING:—By D. J. Asana, L.M.S., B.M.S., Teacher in Surgery, B. J. Hospital, Ahmedabad. Pp. 44. Price 8 annas.**

THIS little pamphlet is a full and detailed scheme for note taking in every variety of surgical case. It deals in turn with the general notes which should be taken for any surgical case, and with surgical cases involving the different systems, and different types of surgical lesions. The student will find in it a complete scheme, which, if faithfully followed, will ensure that he misses but little of importance in taking notes upon a surgical case.

**PRACTICAL CHEMICAL PHYSIOLOGY:—By W. W. Taylor, M.A., D.Sc. Edward Arnold & Co., London, 1922. 71 pp. Price 4-6 net.**

THIS is a student's manual and within the compass of 68 pages, the author has attempted to abbreviate the subject according to the requirements of students. The book is divided into three main parts, Part I, covering 32 pages, deals mainly with the carbohydrates,

proteins and fats. The subject of "blood" has been touched upon at the end of this part, and here a little more detailed consideration would not have been out of place, considering the great importance attached to biochemical and physiological blood analysis at the present day.

Part II deals with digestion and enzymes, and within the limits of 12 pages all that the student requires to know has been briefly but clearly stated. Part III deals with urine analysis and gives all the necessary information required by students for practical class work.

The book should prove useful to medical students as a laboratory handbook.

**AIDS TO PHYSIOLOGY:—By John Tait, M.D., D.Sc. and R. A. Krause, M.D., D.Sc. London: Baillière, Tindall & Cox. 2nd edition, 1924. Pp. 355. Price 7/6 net.**

THIS well known little volume of the "Aid" series has been thoroughly revised and brought up to date, incorporating some of the latest advances in physiology. Important additions have been made to the first edition—namely, "The Chemical Regulation of Respiration," "The Sympathetic Nervous System," and a few new diagrams.

While in no way recommending the use of small synopses of this type, which can only give a very meagre account of such a subject as physiology, we think that this little volume,—one of the best of its kind,—may prove useful to students in refreshing their knowledge before examination, although the average student, if he takes conscientious notes, should not require its help.

**HAEMATOLOGY:—By A. Knyvett Gordon, M.B., B.C., B.A., Cantab. London: Baillière, Tindall & Cox, 1923. Pp. 100. Price 5/- net.**

THIS handy little book on practical hæmatology should prove very useful to the student of general medicine and to the practitioner who was allowed his knowledge on the subject to get at all rusty. In India this subject forms such an important part of general practice that a book of this kind should be in the equipment of almost every doctor.

The chapter on the biology of the blood gives the student an opportunity of understanding the "why and wherefore" of the various blood conditions with which he will meet. There is a useful chapter on the technique of the cytological examination of the blood, but a few pages on the technique of the white blood count, a matter which is dismissed in a few lines, would not have been out of place. The general significance of various blood conditions is dealt with and then the blood picture of a number of diseases is given separately. Finally there is a chapter on blood parasites.

It is a clearly written book and contains some very useful information on its subject, although we consider that a little further treatment of some subjects would have enhanced the value of the book very considerably without adding much to its bulk.

**AIDS TO PRACTICAL PATHOLOGY:—By F. W. W. Griffin, M.A., M.D., B.C. (Cantab.), M.R.C.S., L.R.C.P. and W. F. M. Thompson. Baillière, Tindall & Cox, London, 1923. Pp. 246. Price 4/- net.**

THIS is a small book of convenient dimensions designed to be of ready assistance to those carrying out clinical pathological examinations. It deals with analyses of the blood and urine, of the gastric contents, puncture fluids, feces and human milk and in addition with bacteriological and histological examinations and technique. The more recent applications of chemical methods in the examination of the blood are succinctly described.



This small book contains a great deal of concise and comprehensive information and will be a valuable addition to a laboratory library for ready reference

**PRINCIPLES OF BACTERIOLOGY:—By A. A. Eisenberg, A. B., M. D. 2nd, 1923 edition C. V. Mosby Co., St. Louis. 214 pp., 40 illustrations. Price \$2.25**

ORIGINALLY written for nurses and for laboratory assistants, this is a useful and very clear little book upon the subject of bacteriology in general. Cultural diagnosis and the different media used are given special prominence, whilst the general get-up, binding and illustrations leave nothing to be desired. Summaries at the end of chapters and a fairly full bibliography of the more important text books and journals dealing with bacteriology lend an added value to the book, which is one which is especially suitable for the class or students for whom it is intended as well as for the medical student who is commencing to study the subject. This the second edition includes much matter not included in the first such as a description of the newer Memmick Sachs-Georgi, Kahn and Dold tests for syphilis in place of the Wassermann reaction, and a discussion of modifications of Gram's method. The book is also one which will be found useful for general reference in laboratory work.

**1. LECTURES IN BACTERIOLOGY FOR JUNIOR STUDENTS By Dr. D. A. Turkhud Tatva Vivechaka Press, Bombay, 1923 Pp 370 +xxiii Price Rs 6**

**2. PRACTICAL BACTERIOLOGY —By the same author. Printed for private circulation only. Pp 15.**

THESE two little but books will be found most useful by Indian student who wish for a practical book at a cheap rate. Dr. Turkhud's work at the Bombay Bacteriological Laboratory is well known and as he is a most conscientious teacher it is pleasant to be able to welcome the publication of his lecture notes. The information given is exceedingly complete there is a good index, whilst the first volume is well bound in black cloth covers. In fact the information contained is much more than a course of bacteriology it is rather a compendium of information for laboratory workers. That it is well up to date is shown by the inclusion of such topics as the hydrogen ion concentration, and Dreyer's detached tubercle vaccine.

**X-RAYS: THEIR ORIGIN, DOSAGE, AND PRACTICAL APPLICATION—By W. E. Schall, B. Sc. Lond., F. Inst. P. John Wright & Sons Ltd., Bristol, 1923 Price 5/- Pp 119**

This book though written by the head of the firm of Messrs. Schall and Son is in no sense an advertisement it is a thoroughly practical treatise on the employment of X-rays in diagnosis and treatment without special reference to the apparatus of any firm. The theoretical side is dealt with to the extent that is necessary for obtaining a grasp of the subject the bulk of the book is taken up with clear explanations of the instruments and methods which are employed in modern X-ray work. Dosage is treated in an exceptionally clear and practical manner and the book will be found to be exceedingly useful by all who have charge of X-ray apparatus and also by those who have to prescribe treatment.

It does not deal at all with findings but merely with the technical side of the subject, but there is an interesting discussion of the relative applicability of X-rays and radium in various conditions.

**ANNALS OF ROENTGENOLOGY VOL. III. DIGESTIVE DISTURBANCES IN INFANTS AND CHILDREN.—By C. G. Kerley, M. D. and L. T. Le Wald, M. D. New York. Paul B. Hoeber Pp 81 Price \$12.00 net.**

This volume is one of a series of monographic atlases edited with a view to supplying the practitioner

and practising roentgenologist with a series of first class skiagrams illustrating some of the less frequented by-ways of roentgenology.

The book is divided into two parts, first the text with a description of the special technique required and of the diseases illustrated in the second part of the atlas.

The skiagrams are all of a high degree of perfection and are profusely lettered and marked to facilitate reference.

This volume should prove a most useful work of reference not only to the practising roentgenologist, but also to the general practitioner by showing him where he may expect help from the X-ray specialist.

**DOSAGE TABLES FOR DEEP THERAPY—By Professor Friedland Voltz Edited by Reginald Morton, M. D. William Heinemann, Ltd., London Price 10/6**

THIS little book should prove invaluable to all who are engaged in X-ray therapy. The dosage tables, though originally designed for use with the type of radiation evolved by Professors Seitz and Wintz at Erlangen, are applicable to radiation of other wave lengths, provided it is homogeneous. All that is necessary is to standardise an X-ray tube by finding its unit skin dose and then use it for comparison with other types. The relative dose for certain specified conditions can then be ascertained from the tables for any particular X-ray tube.

It only to impress upon him the necessity for standardisation, as opposed to haphazard methods, this book should be carefully perused by every radiologist.

**THE EFFECTS OF RADIUM UPON LIVING TISSUES: WITH SPECIAL REFERENCE TO ITS USE IN MALIGNANT DISEASE—By Sidney Forsdike, M. D., B. Sc., F. R. C. S. London. H. K. Lewis & Co., Ltd., 1923 Pp 72 Price 5/- net**

THIS little volume deals with an aspect of radium therapeutics with which every practising physician should be familiar. The subject is dealt with concisely and clearly from the point of view first of the action of radium on different normal tissues and secondly of its action on malignant tissue. Such interesting and important problems as the question whether weak radiation stimulates tumour growth or not are discussed. The author quotes authorities and his own experience to show that no such stimulation takes place.

The book also contains a report on fifty cases of uterine cancer and forty-five cases of persistent uterine hemorrhage treated with good results by radium.

It is a volume therefore of interest to the radio-therapist, the gynaecologist and the general physician to all of whom it can be confidently recommended.

**PHYSIOTHERAPY TECHNIC—By C. M. Sampson, M. D. St. Louis. C. V. Mosby Co., 1923. Price \$6.50. Pp 443**

THIS volume, written and published in typical American style, covers the whole range of physiotherapeutics, including actino-therapy, hydrotherapy, etc., and should find a place on the bookshelf of every physician interested in these branches of medical treatment.

Physical remedies are grouped under 4 heads, viz., thermal, chemical, mechanical, and electronic. But it is pointed out that this classification is not absolute and the author does not stick to his classification in his treatment of the subject in hand.

Some new ideas as regards treatment are set forth, for instance the use of ultra-violet radiation in the prevention and cure of X-ray dermatitis and the use of diathermy and ionizing doses of X-rays in peripheral nerve injuries. If the author's claims are not exaggerated, both these lines of treatment should prove

a considerable addition to our armamentaria in dealing with such conditions

The style of the book is somewhat loose and it is sometimes difficult to decide which of the different procedures described the author prefers. But on the whole it forms interesting reading, and gives in concrete form a side of therapeutics seldom presented to the average practising physician

## ANNUAL REPORT.

THE 59TH ANNUAL REPORT OF THE  
DIRECTOR OF PUBLIC HEALTH, MADRAS  
FOR THE YEAR 1922 MADRAS SUPDT,  
GOVT PRESS PRICE 14 ANNAS

MADRAS has for so many years taken the lead in public health activities in India that the annual public health report for the Province is of exceptional interest, and the report for 1922 is no exception to this rule. The covering Government resolution to this report is so able a document and so well summarises the position that we may perhaps be pardoned for quoting from it *in extenso*. It will be seen that the year 1922 was noteworthy for a thorough reorganisation of the department and above all for clearly defining the duties of the district health officer and his staff. The following abstracts afford an admirable summary of the report—

"The outstanding feature of the administration of public health in the Presidency during the year is the complete reorganization of the preventive staff employed by the Government and the local bodies. For preventive purposes the Government had hitherto employed eight cholera parties for dealing with epidemics of cholera in rural areas and 103 deputy inspectors of vaccination to supervise the work of vaccinators. In districts exposed to plague infection, Collectors employed a staff of plague inspectors at the expense partly of provincial and partly of local funds. All local boards maintained a staff of vaccinators and several of them employed a few sanitary inspectors for general sanitation work.

The cholera parties, each of which consisted of an assistant surgeon and 10 sanitary inspectors were all stationed in Madras and were sent out to the districts on the requisition of Presidents of district boards, but owing to delay on the part of the officers responsible for the registration of vital statistics in reporting epidemics of cholera and the time required for the transfer of a party from one district to another the parties almost invariably arrived at the seat of the epidemic too late. Little preventive work was possible in the circumstances, and the amount spent on travelling allowances was very large. There was also very little effective control over the work of the deputy inspectors of vaccination. The ranges of Assistant Directors of Public Health were unwieldy and a very considerable portion of their time was spent in the routine inspection of municipalities. The wastage involved in the maintenance of a separate trained staff for dealing with each epidemic disease was enormous and this wastage was to a large extent avoidable, for the periods of maximum incidence of the chief epidemic diseases are not often simultaneous. There was besides no authority in the district to co-ordinate the work of the various sanitary staffs employed. The Collector was responsible for plague, the cholera parties were directed by the Director of Public Health, while vaccination was under the control of local bodies. The District Medical and Sanitary Officer was the recognized sanitary adviser for local bodies, but his time was so fully occupied with headquarter hospital work that it was impossible for him adequately to supervise or co-ordinate sanitary work in the district. Nor could he in the absence of any statutory powers exercise any

effective control over the staff maintained by the local bodies

The position was thus very unsatisfactory. The Government in their Order No 817-P.H., dated 13th June 1922, directed the amalgamation of the services of deputy inspectors of vaccination and sanitary inspectors belonging to cholera parties. Subsequently they disbanded three of the cholera parties as a tentative measure and distributed the staff among five selected districts (Trichinopoly, Tanjore, Kurnool, Kistna and Vizagapatam), each of which was provided with a trained health officer and a staff consisting partly of deputy inspectors of vaccination and partly of sanitary inspectors attached to the cholera parties. The results of the experiment were most encouraging. In a comparatively short time the district health officers of Kurnool, Trichinopoly and Tanjore were able to trace the foci of infection of cholera in their districts. By controlling these foci just before the period when an outbreak is expected, it is anticipated that the spread of the disease which breaks out in an epidemic form periodically in these districts will be arrested in future. Excellent work was also done by the district health staff in connexion with the outbreak of a relapsing fever in the Tanjore and Trichinopoly districts. The adoption of prompt preventive measures resulted in an enormous decrease in the mortality as compared with the previous year. In Trichinopoly the number of successful vaccinations was doubled in the course of a few months. In view of the success of the experiment, the Government decided to abolish all the cholera parties and employ a health staff in each district to deal with all epidemic diseases and to be responsible for public health work in general. Each district now has a trained district health officer and 8 to 13 inspectors, who can be concentrated at any portion of the district in case of necessity.

The work of the district health officer and the staff has now been clearly defined. Their principal duties are as follows—

(a) Investigation and control of all outbreaks of communicable diseases in rural areas,

(b) the supervision of all vaccination and other protective inoculations at present carried out by a special staff,

(c) the supervision of registration of vital statistics so as to make them more detailed and more accurate than at present,

(d) the drafting of plans and estimates for simple sanitary projects and taking steps to remedy the defects in village drainage water-supply, etc

(e) propaganda work by means of lantern lectures, cinema lectures, demonstrations, etc,

(f) carrying out of measures to deal with hookworm infestation and such other parasitic infections

Detailed instructions in the form of memoranda prepared by the Public Health Department have also been issued on selected branches of the public health administration for the guidance of local bodies and the district health staffs. Similar memoranda on propaganda work, the employment of voluntary agencies, malaria and maternity and child welfare work have since been issued.

The Government have thus definitely laid down the lines on which preventive work should be organized in the districts and have also provided each district board with a trained health staff to carry out the necessary measures. The question of co-ordination however is a very difficult one. Statutory district health committees have been constituted in five districts, but these do not contain representatives of municipal councils nor do they deal with plague, for which the Collector continues to be responsible. It is not practicable to relieve the Collectors of their responsibility for plague administration for epidemics of plague require very prompt action and the assistance of the revenue authorities and the police is often essential for enforcing preventive measures. Nor is it possible for the local bodies to be independent of the revenue authorities in public health matters, for they have to rely

very largely on the reports and the co-operation of the revenue officers and delay on the part of the village officers in reporting epidemics very often renders the adoption of effective preventive measures impossible. Moreover vital statistics on which the whole policy of the public health administration has to be based, are recorded by village officers who are under the control of the Collector. The question to be decided by the Government is how they should associate the Collector and his revenue subordinates with the public health administration of the district without restricting in any way the powers and privileges conferred by the statute on local bodies. The matter has been considered by the Public Health Retrenchment Committee who have made certain proposals in the interests of efficiency as well as economy. The Government have also consulted selected Collectors and the Standing Advisory Committees of the Local and Municipal and Public Health Administrations, and they hope to issue orders at an early date.

It may be of interest to note that except for the health officers who are paid by local bodies out of a provincial grant the scheme of reorganization referred to above has been carried out without any additional expense either to the Government or to the Local Boards.

*Vital statistics*—In their review of the last annual report the Government commented at some length on the inefficiency of registration work in this Presidency and emphasized the importance of raising the standard of this branch of administration. The present report furnishes further illustrations of the difficulty of basing any definite policy on such imperfect vital statistics. The annual death rate during the year was 21.0 as compared with 20.2 for the previous year, but the Director of Public Health is not in a position definitely to say whether the higher rate registered was due to better registration or to other causes. All that can be said is that the year was comparatively healthy and that most of the other Provinces have registered a lower death rate than in the previous year.

Madras still maintains its reputation for defective registration of vital statistics. The recorded death rate was again the lowest in India though there was nothing to indicate that it was healthier than other Provinces. In his census report the Superintendent of the Census Operations has made an attempt to explain the low birth and death rates in this Presidency as due to causes other than faulty registration and has definitely expressed the opinion that 'it does not appear that the registration of births and deaths in the various districts is badly defective'. The Director of Public Health has subjected this statement to a very detailed criticism and is of opinion that the inference drawn by the Superintendent of Census Operations is based on incorrect data and hypothetical assumptions. Moreover the test adopted by the Superintendent to verify the statement that registration is not very defective is fallacious. He has taken the number of births in the year 1920 and deducted therefrom the reported deaths of infants below one year of age. He finds that the remainder does not differ very materially from the population returned at the census as less than one year old and therefore concludes that registration is fairly accurate. The obvious flaw in the argument is that registration of births as well as of deaths is defective, and if the error in one case more or less neutralises the error in the other it does not follow that registration is accurate. The Government agree generally with the remarks of the Director of Public Health, and they are convinced that the negligence of the registering officers and the failure of the superior revenue officers adequately to realize the importance of accurate vital statistics are largely responsible for the present state of affairs. Local bodies have already been directed to utilise for the purpose of scrutinizing birth and death registers the services of vaccinators during the hot months when vaccination is suspended

and nearly 32 000 unregistered births were detected during the summer of 1922. The Government trust that Collectors, Divisional Officers and Tahsildars will impress on village officers during Jamabandi and also during their ordinary tours the importance of accurate registration of vital statistics. Unless they actively co-operate in this work, public health preventive work on a scientific basis will be impossible. Collectors were requested to report before the 31st of October 1923 what action they had taken to improve the registration of births and deaths in rural areas.

*Cholera*—The number of deaths from cholera registered in the year was 16 502 (0.4 per mille) against 27 064 (0.7 per mille) in 1921. The figure is the lowest on record. The most interesting fact in connexion with this disease is that in several of the districts in which the district health scheme had been introduced as an experimental measure, the foci of infection have been definitely determined and it should hereafter be possible by timely preventive measures taken at the foci of infection to prevent the spread of this disease.

*Small-pox*—A very severe epidemic of small-pox during the year was responsible for the large number of deaths recorded from this disease the number being 22 801 against 9 792 last year. Out of these no less than 16,160 occurred among children under one year of age. The actual number of deaths from this cause was undoubtedly very much larger for as the Director of Public Health has pointed out a large number were registered under 'other causes' or under 'measles'.

The experience of all countries has been that by efficient and universal vaccination small-pox can be easily prevented. By enforcing vaccination with characteristic thoroughness Germany has practically eradicated the disease from the country. The Director of Public Health has in his memorandum published with G.O. No 765-A P.H. dated 1st June 1922 and also in the present report clearly demonstrated the close relation existing between the incidence of small-pox and the state of vaccination. The Government have already in their order referred to above indicated the lines on which vaccination work should be organized and they hope that the increased supervision of vaccination work which has been rendered possible by the introduction of the district health scheme will result in an appreciable reduction in the appalling mortality from this disease.

*Plague*—Plague was prevalent in 14 districts in the Presidency during the year and was responsible for 9,193 deaths against 11 875 in the previous year. The salient feature of the plague preventive measures adopted in the different districts was a demonstration of the fact that if preventive measures are carried out promptly along proper lines which have already been indicated in the memorandum published with G.O. No 897-A, P.H., dated 24th June 1922, the spread of the disease can be successfully arrested. In the Madura district owing to the energy and enthusiasm of Mr Fairburn, the Special Plague Officer and the public health staff under him over 200,000 people (or 93 per cent of the population of the infected villages) were inoculated with the result that there was an almost immediate and noticeable decrease in the death-rate from plague in the district. In Wellington inoculation and an intensive rat-catching campaign stamped out the disease permanently within a very short time. Prompt measures similarly arrested the spread of an epidemic of a particularly virulent type in Ootacamund.

The Government regret to observe that except in the Nilgiris and Madura districts, local authorities conspicuously failed to realize their responsibilities in connexion with plague administration. The Director of Public Health mentions the Municipal Councils of Periyakulam Palni, Coimbatore and Hospet as the worst defaulters in this respect. The attention of all

Collectors is drawn to section 37 of the District Municipalities Act, which they should not hesitate to use when they find that municipal councils fail to discharge their duties in the face of an impending epidemic of plague.

*Relapsing Fever*—The most disquieting feature of the state of public health in the Presidency is the reappearance of relapsing fever in an epidemic form in several districts after a long period of immunity. The disease which is conveyed through lice, is rapidly spreading all over the Presidency and unless its progress is arrested, it is likely that agricultural operations will be seriously interfered with, for it is practically confined to the labouring classes, particularly the depressed classes. The mortality from fevers in Tanjore and Trichinopoly districts, where this disease was prevalent during the first three months of 1922, was 8 to 16 times the normal rate. The death-rate was 37.3 per cent of the attacks and in some villages as high as 66.3. Outbreaks have since been reported in South Arcot, Nellore, Bellary, Guntur and the Nilgiris. Madras City has registered 64 cases and 4 deaths, mostly among scavengers. The Epidemic Diseases Act has now been extended to relapsing fever and every endeavour is being made to stamp out the disease.

*Hookworm*—Dr Kendrick of the Rockefeller Foundation continued in charge of the Hookworm Campaign. The extent of hookworm infection in each district has now been roughly ascertained and the energies of this section of the department have been devoted to educational and propaganda work throughout the Presidency.

*Maternity and Child Welfare*—Infant mortality continues to be very high, particularly in municipalities. In 41 out of 81 municipalities the death-rate was over 200 per mille, 4 of these (Madras, Bezwada, Coimbatore and Virudhunagar) recording a death-rate of over 300. Investigation has shown that this appalling mortality is due largely to inadequacy of maternity relief and want of proper care during the first two or three weeks after birth. A number of voluntary organizations have taken up maternity and child welfare work, but unless municipalities actively associate themselves with the work and find money whenever necessary, no real improvement can be expected.

*Sanitary works*—Financial stringency has made any rapid advancement in the provision of protected water-supplies impossible. High prices of materials and the centage charges now levied at 30 per cent by the Public Works Department have made it difficult for the local bodies to finance water-supply and drainage schemes on the 'half grant half loan' principle. No new schemes have been brought into operation during the year.

Twenty-nine municipalities had protected water-supply systems, but the waterworks have been badly neglected in most places. The Sanitary Engineer has suggested the appointment of a travelling inspectorate to look after these works. The proposal has been under the consideration of the Government for a considerable time, but no decision has yet been arrived at owing to the difficulty of finding money to finance the scheme.

*General*—The year has been one of great activity in every branch of the public health administration. The policy as regards the principal diseases and public health matters in general has been clearly formulated, and the introduction of the district health scheme has made it possible for the local authorities to adopt preventive measures to combat diseases instead of confining themselves to the remedial measures adopted hitherto. The foundations of epidemiological work on a scientific basis have been laid. The Government have been fortunate in having at this period as the head of the department Major Russell, whose great experience of public health work in this country has been invaluable to them. To his ability and tact the successful working of the district health scheme is largely due, and the Government have no doubt that if the work is carried on on the lines laid down by him, his optimism as

regards the future of public health in this Presidency will be fully justified.

Turning to the main body of the report itself, which is by Major A. J. H. Russell, M.A., M.D., D.P.H., D.T.M., I.M.S., there are certain items and explanatory information which are not included in the above resumé—

The economic conditions in 1922 were favourable, the prices of food grains contrasting favourably with those of 1921 and 1920. The entire population dealt with totals 41,002,827, exclusive of Europeans and Anglo-Indians, who numbered 34,328. Emigration, although always a factor in the public health returns, was in excess of immigration, but to a less extent than in former years, 326,744 emigrants as against 298,509 immigrants. The registration of vital statistics is noted as having been worse in many "compulsory areas" than in some "non-compulsory areas", yet during the year only 93 prosecutions were instituted for failure to report births or deaths. Madras registers a larger number of married females,—1,063,—per 1,000 married males than does any other Province in India. One would therefore expect its birth rate to be high, yet, at 30.7 per mille for the decennium 1911—1921, it is one of the lowest recorded, the corresponding figures for the Punjab being 43.8, for the United Provinces 42.2 and for the Central Provinces 45.5. It would be absurd to suggest that the fecundity rate of the female population in Madras is so much lower than that in these other Provinces and the difference must be ascribed to defective registration of vital statistics. The Superintendent of Census Operations has attributed this remarkable difference to such factors as a smaller percentage of married among the female population in Madras, an increased mortality in the female population before and at the child-bearing age, emigration of males at the reproductive age, inter-marriage of cousins, and defective registration during the influenza epidemic, but Major Russell, dealing with these objections seriatim, shews that none of them will give even a partial explanation of the discrepancy. It is due to errors in the recording of vital occurrences. During the hot weather months of 1922, for instance, when vaccination operations were suspended and the work of the vaccination department was turned to the checking of vital statistics, it was found that in 24 districts no less than 31,895 births had gone unrecorded, in addition to which assistant directors of public health detected a further omission of about 2,300 unregistered births. In fact the estimated real birth rate for the Presidency is 42.5 per mille, and not 30.0 per mille as recorded.

Figures for death rates and especially for infantile mortality are nearly as bad. The registered infantile death-rate for the year was 166.4 per mille of registered births, yet when the detailed figures come to be compared with those for 1921, such glaring discrepancies come to light as for Nellore,—a decrease in a year of 42.5,—and Coimbatore, an increase in the year of 42.5. Small-pox having been unusually prevalent during the year, may have accounted for a part,—but only for a part of these differences, in the main they are due to defective registration. Thus Kistna recorded an infantile mortality during the first week of life of 49.2 per mille. Coimbatore one of only 11.6 per mille. In Madras City an unprecedented infantile mortality rate of 331 per mille was partly due to epidemic small-pox. "The slaughter of the innocents which has been, and still is, going on in the areas for which they are responsible is an immense slur upon the activities of the Municipal Councils," writes Major Russell.

The two really serious epidemics of 1922 in the Presidency were small-pox and relapsing fever. Here, as also with cholera, the importance of early notification of the first cases is the desideratum. If delay occurs in reporting the first cases, the situation rapidly passes out of control. "For instance, over 50 deaths from cholera occurred in Arkonam (North Arcot district) before the outbreak was brought to notice, and

even then it was reported by the railway authorities" Chlorination of water supplies has proved the most effective single agency employed

With regard to small-pox registration figures are no better than usual Saidapet municipality returned 123 attacks with 123 deaths—an obviously impossible return, whilst in Conjeevaram, where the epidemic raged for months, a small pox death-rate of only 17 was returned Several reports having been received of deaths from small-pox among vaccinated children special investigations were set on foot In every case investigated it was discovered that the vesicles were spurious or the cicatrices so small that no protection had been afforded The results were largely due to the return of infants shewing one partial vesicle as fully protected and no instance of death from small-pox in any child which had been properly vaccinated was brought to light

One of the most satisfactory features of the report is the steady decline in recent years of intestinal diseases thus deaths from dysentery and diarrhoea have steadily declined from a total of 79,841 in 1918 to a total of 51,805 in 1922 and from cholera from a corresponding figure of 122,263 to one of only 16,502 On the other hand relapsing fever has almost suddenly assumed very great importance with heavy case mortality in many areas, and a special incidence among the depressed classes, who are especially the victims of the disease As contrasted with Major Craggs figures for the United Provinces, the incidence among females was almost as high as amongst males

Major Russell is to be congratulated on this report It may have depressing and disquieting features, but it shews that the Madras Presidency is living up to its past record that public health matters are the very serious and grave concern of Government, that throughout a policy of enlightened progress is afoot, and—although many signs of omission may be recorded in its pages—yet they are not glossed over, but are grappled with In brief we see here some approach at least to the generalised public health service for a Province and for India which Colonel King has insisted upon The recognition of the absolute untrustworthiness of the registration of vital statistics in India may well be the first step towards reforming such registration

## Correspondence.

### INTESTINAL COLEOPTERA

To the Editor "THE INDIAN MEDICAL GAZETTE."

SIR—With reference to the letter from Dr S C Sen, L.R.P. on the above subject published in the February issue of the *Indian Medical Gazette* I desire to say that so far no convincing proofs are at hand to explain the method of invasion of the intestines of children by these very peculiar beetles Whether they enter by the mouth as an egg and undergo development into larva and pupa and finally into the adult beetle within the intestines, or whether they enter *per rectum* while children defecate in the open is not certain Senior-White was the first to note that *Onthophagus bifasciatus* Fb (Copridae) infested the intestines I have since observed that some other species allied to the above may cause similar trouble When we find out what species of beetles infest human intestines in this way, a study of their habits would throw light on the mechanism of invasion of these beetles The proper identification of the beetles is therefore important.

I would request medical men who may come across such cases of children infested with intestinal beetles to send me specimens (preserved in spirit) of beetles actually observed by them to have been passed by

children, I should also like to have any notes of interest they may have made on the subject

Yours, etc,

M V T IYENGAR.

DEPARTMENT OF PUBLIC HEALTH,  
2 Convent Lane, Calcutta,  
15th February, 1924

### HOOKWORM DISSEMINATION

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR—In the December number of the *Indian Medical Gazette*, Dr Borland McVail, referring to my article on the 'Dissemination of Human Helminthic Infections by Animals,' *Indian Medical Gazette*, September 1923, asks how I proved the larvæ hatched from pigs' faeces to be the larvæ of human hookworm

My diagnosis was based on the fact that human ankylostome ova were found apparently intact in the faeces of pigs which had swallowed human faeces, that larvæ indistinguishable from human hookworm larvæ hatched out in cultures and that no hookworms as far as I could ascertain were found in the gastro-intestinal tracts of the pigs I post-mortemed. I would here mention that the faeces of two control pigs, which I had under observation, neither had ova resembling human hookworm ova on microscopical examination nor did larvæ resembling human hookworm larvæ hatch out in cultures

Professor Leiper, the reliable helminthologist to whom I sent my specimens from post-mortemed pigs for identification, will doubtless inform me if he has found the *Vicatrix sulcus* of Ackert and Payne or helminths whose larvæ may be indistinguishable from hookworm larvæ in Assam pigs

Dr McVail in his *Reports on the work done in the Hookworm Research Department of the School of Tropical Medicine, Calcutta* for 1921 and 1922 does not mention ever having post-mortemed his faecal fed and control pigs to prove the presence or absence of "pig hookworms" or other helminths whose larvæ might resemble human hookworm larvæ

It was for this reason that I undertook this investigation as Dr McVail's opinions on pigs as "health providers" are contrary to my own personal experiences in this district

Again, Dr McVail mentions that he has pointed out the destructive effect of temperatures above 98.4°F on the ova of ankylostomes and necators and states that as the normal temperature of the pig is about 104°F (in Cachar the normal temperature varies from 102.6°F to 104°F) survival of living human ova is unlikely

Dr McVail's researches are doubtless true when hatching out larvæ in cultures, but as I have frequently demonstrated, human hookworm larvæ will hatch out from hookworm infected faeces passed by patients suffering from pneumonia and malaria with temperatures ranging from 102°F to 105°F, the faeces being collected during the febrile period, so why not from the gastro-intestinal tracts of pigs when surfeited with human faeces?

I am, etc,

G C RAMSAY

LABAC CENTRAL HOSPITAL,  
DEWAN  
Cachar, Assam  
23rd January, 1924

### INSULIN IN THE TROPICS

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR—You were kind enough to publish in a recent issue of your journal a letter giving the results of some rabbit tests I made on a sample of insulin imported into India in September last. The animals experimented on had relatively high initial blood sugar levels viz, 140, 135 and 141 mgm per cent. I have recently

had an opportunity of testing a sample of "A B" brand insulin, issued in November 1923, on rabbits with low initial blood sugars. Although imported during the cold weather, this sample, like the previous one, was not imported in cold storage nor kept in cold storage in India after importation. The rabbits were starved for 24 hours before injection. The following are the results—

I Rabbit 1.45 kilos, 25th January 1924

Time	Blood sugar mgm per cent	Remarks
9	105	10 units insulin subcutaneously

9 50	51	
10 20	51	
10 50	22	Convulsions

II Rabbit 1.35 kilos, 8th February 1924

Time	Blood sugar mgm per cent	Remarks
9 30	103	5 units insulin subcutaneously
10 30	87	
12 0	45	animal listless, breathing rapidly
12 35	53	

The animal was fed at this stage but died in convulsions 6 hours later.

III Rabbit 1.5 kilos, 8th February 1924

Time	Blood sugar mgm per cent	Remarks
9 20	109	3 units insulin subcutaneously
10 20	53	
11 50	66	
12 20	82	No symptoms

Five units therefore produced a fall in blood sugar of 58 mgm per cent in 2½ hours and caused late convulsions while 3 units or one "rabbit dose" reduced the blood sugar by 56 mgm per cent in one hour but did not cause convulsions.

As however convulsions occur in rabbits at somewhat variable blood sugar levels, the absolute reduction of blood sugar is a more reliable test of the potency of insulin. Test animals should be starved for 24 hours before injection so as to reduce the glycogen content of the liver, and the initial percentage of blood sugar should be somewhere between 100 and 120 mgms per cent. If a fall in the blood sugar percentage to 45 mgm in such an animal weighing 2 kilos be taken as the standard for 3 units, the sample tested would seem to have undergone but little deterioration.

Yours, etc,  
T A HUGHES,  
Major, I M S

### INTRAPERITONEAL INJECTION OF ANTI-SERA

To the Editor, "THE INDIAN MEDICAL GAZETTE"

SIR,—I should like to draw the attention of your readers to a note on the "Intraperitoneal Injection of Antitoxin in Diphtheria" in the *Lancet* of the 3rd November 1923, p 994, as indicating the probability of the successful use of this route in man not only for diphtheria antiserum, but also for all antisera including antivenene. In reading clinical reports of fatal cases of snake bite I have been struck by the frequency of the reporting of the giving of antivenene subcutaneously, owing to the difficulty of giving it intravenously on account of the small size of the veins from collapse of the patient. If it be thought inadvisable to cut down on and expose a large vein such as the saphenous or even the femoral (personally if I were bitten by a cobra or Russell's viper I would rather this were done than that an intravenous injection was not given) then surely the intraperitoneal route is to be preferred to the hopelessly ineffective subcutaneous one. Acton and Knowles, experimenting on monkeys, have shown

that the intravenous route is twice as effective as the intraperitoneal and the latter in its turn twice as effective as the subcutaneous.—*Indian Journal of Medical Research*, Vol III, p 350,—so failing the intravenous—which as I say should not be allowed to fail, the intraperitoneal route is indicated in preference to the subcutaneous.

Yours, etc,  
H H KING,  
Major, I M S

CENTRAL RESEARCH INSTITUTE  
KASAUJI  
6th March, 1924

### THE TROPICAL DISEASES' BUREAU A CORRECTION

To the Editor, "THE INDIAN MEDICAL GAZETTE"

SIR,—On my return from the United States and Canada I have seen the number of the *Indian Medical Gazette* for January 1924, containing the notice headed "The Wellcome Bureau of Scientific Research."

I much appreciate what the writer is good enough to say regarding my work, although I feel he does me far too much honour and I must thank the *Gazette* for its kind congratulations on my new appointment, a post which I trust will bring me even into more close relationship with sanitary matters in India than heretofore. There is however, one point in the notice to which I would allude for the writer has evidently confused the Wellcome Bureau with the Tropical Diseases' Bureau. The latter from its inception has been directed by Dr A G Bagshawe C M G, who is the Editor of the *Tropical Diseases Bulletin* which, with its Sanitary Supplements, provides such an admirable resume of the huge literature dealing with tropical medicine and hygiene.

My only association with the Bureau is that I happen to be one of the Honorary Managing Committee but the conduct of the Bureau and the issue of the *Bulletin* rest entirely with Dr A G Bagshawe and it is due to his unremitting labours and wise control that the Bureau has attained so much success and that the *Bulletin* is as you say, indispensable to the medical man practising in the tropics.

Yours, etc,  
ANDREW BALFOUR, C B, C M G

ROYAL SOCIETY OF TROPICAL MEDICINE  
AND HYGIENE,  
11, CHANDOS STREET,  
CAVENDISH SQUARE, LONDON, W 1  
23rd February, 1924

### THE TYPHUS GROUP OF FEVERS

To the Editor, "THE INDIAN MEDICAL GAZETTE"

DEAR SIR,—I have read with great interest an article on the typhus group of fevers in the February number of the *Gazette*, by Lt-Col J W D Megaw, I M S.

I have seen five cases of fever of typhus type amongst Europeans since 1915. Reading the article brought these cases back very vividly, and I am sure they would be correctly tabulated in the columns of the second half of Table 1 of the paper. Unfortunately I have no notes of the cases, but it occurred to me that the distribution of the cases might be of interest.

They occurred as follows—

Hubli	One case
Dharwar	Two cases
Gadag	One case
Pakala	One case

All the cases were mild except one, none were fatal. I remember at the time the first came to my notice in 1915 we were hearing about spotted fever in Mesopotamia, and there were many soldiers from that area travelling between Belgaum and Bangalore, and

# Food for the Invalid



When your patient needs a strengthening and easily digested food use Bovril.

Bovril is the powerful nourishment of beef in a highly concentrated form. It is easily assimilated even by a weakened digestion, and it helps to restore the system to a normal state of health.

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The above quotation from a chapter dealing with the use of *Gonad Co.* (Harrower) in cases of impotence is from

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LONDON, W. 1.



I thought it possible that infection might occur in railway carriages.

Four however of the patients might easily have been infected by jungle ticks.

Yours, etc.,

A IVAN JACKSON, L.R.C.P., L.R.C.S.  
(Edin), D.T.M. (Liverpool),  
District Medical Officer, Hubli

21st March, 1924

## THE 'CRESCENT' DISSECTING MICROSCOPE

WITH reference to the advertisement of the "Crescent" dissecting microscope on p. iv of our issue for February last, Messrs R and J Beck ask us to state that the price of the stand (only) is £2-17-6, and not £2-17-4, as incorrectly stated in the advertisement—*Editor, I M G*

## Service Notes.

### APPOINTMENTS AND TRANSFERS

COLONEL R. HEARD, M.D. K.H.S. I.M.S. Inspector-General of Civil Hospitals Punjab, is appointed as Surgeon-General with the Government of Bengal with effect from the date on which he assumes charge of his duties.

Lieutenant-Colonel A. Hooton, C.I.E., I.M.S. officiating Surgeon-General with the Government of Bombay is confirmed in that appointment, with effect from the 11th January 1924.

Lieutenant-Colonel E. E. Waters, M.D. M.R.C.P. I.M.S., Surgeon Superintendent Presidency General Hospital, Calcutta was appointed to act as Surgeon-General with the Government of Bengal in addition to his own duties, with effect from the afternoon of the 26th February to the 11th March 1924, inclusive.

Lieutenant-Colonel E. D. W. Greig, C.I.E., I.M.S., is appointed to act as Director of the Pasteur Institute, Shillong, with effect from the date on which he assumes charge of his duties on return from leave.

Lieutenant-Colonel E. L. Ward, C.B.E., I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals Punjab, with effect from the afternoon of the 29th February 1924.

Lieutenant-Colonel A. H. Proctor, D.S.O., I.M.S., Civil Surgeon is transferred from Murshidabad to Darjeeling *vice* Lieutenant Colonel J. B. Christian, I.M.S., transferred.

Lieutenant-Colonel J. B. Christian, I.M.S. Civil Surgeon, is transferred from Darjeeling to Murshidabad, *vice* Lieutenant-Colonel A. H. Proctor, D.S.O., I.M.S., transferred.

Lieutenant-Colonel C. B. McConaghy, M.B. I.M.S. Agency Surgeon Bhopal is appointed to officiate as Political Agent in Bhopal in addition to his own duties with effect from the 15th February 1924 and until further orders.

Lieutenant-Colonel J. Husband, I.M.S., an Agency Surgeon, is posted as Residency Surgeon, Kashmir with effect from 13th March 1924.

Lieutenant-Colonel R. F. Steel, I.M.S. Civil Surgeon, Ahmednagar, to act as Civil Surgeon, Poona, *vice* Lieutenant-Colonel E. C. G. Maddock, I.M.S., granted leave from 27th March 1924.

Major A. D. Stewart, M.B., F.R.C.S.E., D.T.M.H., I.M.S., Director of Public Health Laboratory, Bengal, is appointed to officiate as Professor of Hygiene, School of Tropical Medicine and Hygiene, Calcutta, in addition to his own duties during the absence on leave of Lieutenant-Colonel A. B. Fry, C.I.E., D.S.O. M.D. I.M.S.

Major T. C. Boyd, F.R.C.S.I. I.M.S., officiating Chemical Examiner, Bengal and Professor of Chemistry, Medical College, Calcutta, is confirmed in the appointment, with effect from the 23rd August 1921.

The services of Major K. G. Pandala, M.B. F.R.C.S., I.M.S. are placed permanently at the disposal of the Government of Madras, with effect from the 10th January 1924.

Major R. H. Candy, I.M.S., to act as Civil Surgeon Hyderabad, *vice* Lieutenant-Colonel R. W. Anthony, I.M.S. granted leave from 8th March 1924.

Major P. K. Gilroy, I.M.S., to act as Senior Surgeon J. J. Hospital and Professor of Surgery Grant Medical College, Bombay, *vice* Lieutenant-Colonel T. S. Novis, I.M.S. granted leave from 6th April 1924.

The services of Major (temporary Lieutenant-Colonel) T. J. Carey-Evans, M.C., F.R.C.S., I.M.S. are replaced at the disposal of the Government of India in the Foreign and Political Department, with effect from the 29th April 1924.

The services of Captain I. Findlay, M.B. I.M.S. are placed temporarily at the disposal of the Government of Burma for employment in the Jail Department with effect from the date on which he assumed charge of his duties.

The services of Captain K. B. Bharucha, I.M.S. are placed temporarily at the disposal of the Government of Bihar and Orissa with effect from the date on which he assumes charge of his duties in the Jail Department of that province.

The services of Captain L. S. Modi, I.M.S. are placed temporarily at the disposal of the Government of Bihar and Orissa for employment in the Jail Department with effect from the date he assumes charge of his duties.

Captain E. T. N. Taylor, I.M.S. is appointed to act as Civil Surgeon, Ahmednagar, in addition to his military duties.

### LEAVE

LIEUTENANT-COLONEL A. H. PROCTOR, D.S.O. M.D. F.R.C.S.E. I.M.S. Civil Surgeon was allowed (1) leave on average pay from the 1st to the 16th January 1922 under article 81 (b) (i) of the Fundamental Rules and (2) leave on half average pay from the 17th January 1922 to the 8th March 1923 under article 81 (d) of the said rules in place of the leave previously granted to him from 1st January 1922.

Lieutenant-Colonel A. B. Fry, C.I.E., D.S.O. M.D. I.M.S. Professor of Hygiene School of Tropical Medicine and Hygiene Calcutta is allowed leave on average pay from the 15th July to the 1st October 1924 under article 81 (b) (i) of the Fundamental Rules.

Lieutenant-Colonel T. S. Novis, I.M.S. is granted leave on average pay for seven months with effect from the 5th April 1924, or from the subsequent date of relief.

Lieutenant-Colonel G. J. Grafton Young, I.M.S. Surgeon to His Excellency the Governor of Bombay, is granted with effect from the 15th March 1924 leave on average pay for four months combined with such furlough under military rules as would bring the combined period of leave to eight months.

Lieutenant-Colonel J. H. Hugo, D.S.O. I.M.S. an Agency Surgeon is granted leave on average pay for eight months combined with leave on half average pay for eight months and four days under Fundamental Rule 81 with effect from the 13th March 1924.

### PROMOTIONS

LIEUTENANT-COLONEL R. A. NEEDHAM, C.I.E. D.S.O., M.D. I.M.S. to the rank of Brevet-Colonel, with effect from the 2nd February 1924.

### Majors to be Lieutenant-Colonels

Horace Sidney Matson, M.B. Dated 1st March 1924  
Alexander Cameron, O.B.E. M.B. Dated 1st March 1924

Alfred Henry Proctor, D.S.O., M.D., F.R.C.S.E. Dated 1st March 1924

Robert Tait Wells, M.D. Dated 1st March 1924

Ian Macpherson Macrae, O.B.E., M.B. Dated 1st March 1924

Alexander Spalding Mackie Peebles, M.D. Dated 1st March 1924

Francis Broughton Shettle, O.B.E. Dated 1st March 1924

#### *Captains to be Majors*

L. A. P. Anderson Dated 27th January 1924

W. C. Paton, M.C., M.B., F.R.C.S.E. Dated 27th January 1924

J. B. Hance, O.B.E., M.B., F.R.C.S.E. Dated 27th January 1924

G. Y. Thomson, M.B. Dated 27th January 1924

C. McIver Dated 27th January 1924

#### *Lieutenant to be Captain (Provisional)*

H. J. Rice, M.C., M.D. Dated 4th December 1923

*Lieutenant (temporary Captain) to be Captain*  
Vijaya Shankar Rao Pandit Dated 4th July 1922

#### *To be temporary Lieutenants*

Ratan Chand Dated 1st February 1924

Birendra Nath Hazra Dated 17th February 1924

#### RETIREMENTS

MAJOR-GENERAL C. H. BOWLE-EVANS, C.M.G., C.B.E., M.B., K.H.P. I.M.S. Dated 19th December 1923

Major-General Sir G. G. Giffard, K.C.I.E., C.S.I., K.H.S., I.M.S. Dated 10th January 1924

Colonel P. F. Chapman, C.I.E., M.B., I.M.S. Dated 27th October 1923

Lieutenant-Colonel F. H. Watling, M.B., I.M.S. Dated 29th February 1924

Lieutenant-Colonel E. M. Illington, F.R.C.S.E., I.M.S. Dated 4th January 1924

Major W. P. G. Williams, M.B., I.M.S. Dated 11th February 1924

#### RELINQUISHMENT OF RANK

LIEUTENANT-COLONEL (NOW COLONEL) A. M. FLEMING, D.S.O., M.B., F.R.C.S.E., I.M.S., relinquishes the acting rank of Colonel on ceasing to hold an appointment as A.D.M.S., 26th October 1921

## NOTICES.

### INSULIN

It is generally known amongst those who have to deal with the subject that there are two great difficulties in the economical manufacture of Insulin for therapeutic purposes.

The first lies in the fact that the pancreas contains, besides Insulin, various substances of unknown composition which decompose this active principle directly the gland is removed from the body and which can continue their action during the process of manufacture.

The second difficulty is that of purifying the Insulin, thus obtaining a product most suitable for injection.

The efforts of a great number of scientific and technical workers on the staff of Burroughs Wellcome & Co. have been directed to the solution of the many problems involved with the result that great improvement has been effected in the yield and the standard of purity of 'Wellcome' brand Insulin, already exceptionally high, has been still further raised.

There have been no dramatic discoveries, but a series of improvements in process has taken place, each step contributing its share to greater economy in preparation and purity of the product.

Owing to the greatly improved methods of manufacture which Burroughs Wellcome & Co. have devised, they are now in a position to announce a further considerable reduction in price. When Insulin was introduced its cost limited its use, but now the circle of users will be considerably widened and patients of all classes will be enabled to enjoy its benefits.

When first issued the cost of a phial of Insulin containing 100 units (approximately 10 doses) was 25/-, subsequently it was found possible to reduce this price to 17/6, and later increased demand together with improved methods of production made it possible further to reduce the price to 12/6. Burroughs Wellcome

& Co. have now taken the initiative in a still further reduction, and the 100 units phial of 'Wellcome' Brand Insulin will be sold in London at 6/8 (that is 8d per dose of 10 units) on and from February 25th. Hospitals will be supplied at a still lower rate.

### "ALLENBURYS" MALTED MILK

MESSRS ALLENBURYS, LTD., have recently placed upon the market a malted milk, and have made arrangements for sending weekly supplies to India. The malted milk requires the addition of boiling water only and whilst acceptable to all as a light form of nourishment for general use, is particularly adapted to the needs of nursing mothers, invalids, dyspeptics and the aged. They will be pleased to forward a small sample tin upon request. The Indian agent is A. H. P. Jennings, Esq., Block E, 2nd Floor, Clive Buildings, Calcutta, Post Box No. 2198, Calcutta. In view of Allenbury's well-known and assured reputation, we are certain that the new product will be of interest to our readers.

### MESSRS C BAKER'S 1924 CATALOGUE

LABORATORY workers and medical men in search of efficient but cheap microscopes and general scientific apparatus would do well to consult the 1924 catalogue of Messrs C Baker's second-hand instruments. The catalogue contains lists of available models of second-hand microscopes and accessories, surveying instruments, astronomical instruments, spectroscopes, projection apparatus, telescopes, physical apparatus, ophthalmological apparatus and photographic apparatus, also information regarding new wireless apparatus. Of many interesting bargains in the first section is a Swift bacteriological microscope, complete with two oculars, a compensating eyepiece, 2 3/4rds, 1/6th, and 1/12th oil immersion objectives, and mechanical stage for £22-10-0. A Leitz 1/7th inch oil immersion fluorite lens—(a lens which gives very clear definition, keeps well in the tropics and is in general almost better for work in the tropics than an apochromatic one)—at £3-16-0 and a Powell and Lealand 1/16th oil immersion objective, apochromatic, at £6. An incandescent electric lamp for microscope work is available at 10/-, and a Zeiss paraboloid dark ground condenser at £2. A Thoma Zeiss haemacytometer is listed at £1-15-0, and a whitewood cabinet to hold 500 slides at £3. A Browning spectrometer with 2 verniers and 1 1/4 inch prism is for sale at £12-10-0, and a very ingenious clinical thermometer re-setting case, by revolving which a clinical thermometer can at once be re-set without risk, at 1s 6d.

The whole catalogue is well worth attention. The firm's address is 244, High Holborn, London, W.C. 1.

## Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints of the literary pages of the "Gazette" gratis, if asked for at the time of submitting their manuscripts.

REPRINTS OF THE ARTICLE CONCERNED (ONLY) IN PLACE OF REPRINTS OF THE WHOLE OF THE LITERARY MATTER OF THE ISSUE CAN BE SUPPLIED IF PREFERRED. BUT AS THESE HAVE TO BE MADE UP SEPARATELY, ARE NECESSARILY DELAYED.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs Thacker, Spink & Co., P. O. Box 54, Calcutta.

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**Angier's Emulsion** facilitates, hastens and completes the processes of digestion and assimilation, so that the patient is enabled to take sufficient nourishing food. It is a strengthener and vitaliser to the body, fortifying its disease resisting powers by increasing the absorption of nutrient material, and it acts as an anti-bacillary agent inhibiting the growth of disease producing bacteria and their toxins.

**Angier's Emulsion** has a specific palliative influence upon the symptoms of Phthisis — fever, night-sweats, cough, expectoration, and exhaustion are ameliorated, and the life of the patient made more comfortable, more free from distressing symptoms. In most cases of Phthisis the use of Angier's Emulsion obviates the necessity of administering depressing and narcotising cough sedatives.

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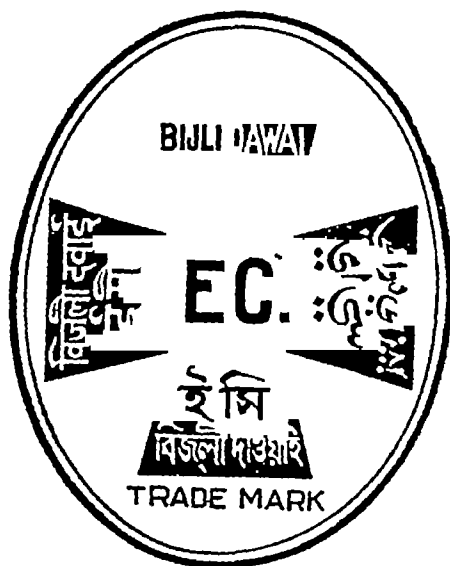
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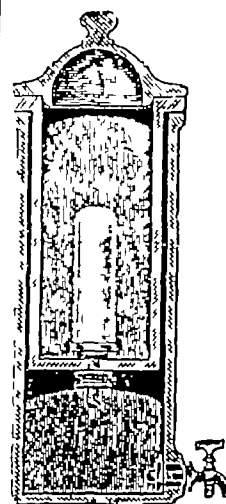
MIHIJAM, E. I. R. (INDIA)

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## DYSMENORRHEA

that Phenalgln shows its most remarkable action. This stubborn condition, which frequently remains obdurate under all other forms of treatment, will invariably yield to Phenalgln. Apart from its value in the relief of pain, Phenalgln, by its vaso-dilator action is also unusually efficacious in the relief of pyrexia and high nervous tension. In fevers, this action induces a gentle perspiration accompanied by a drop in temperature and freedom from restlessness and insomnia. It is therefore of particular value in

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CEPHALALGIA

NEURALGIA

RHEUMATISM

INSOMNIA

MYALGIA

GOUT

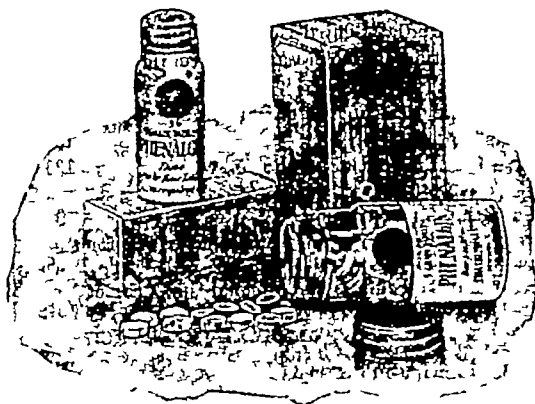
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REPLACES  
OPIUM OR  
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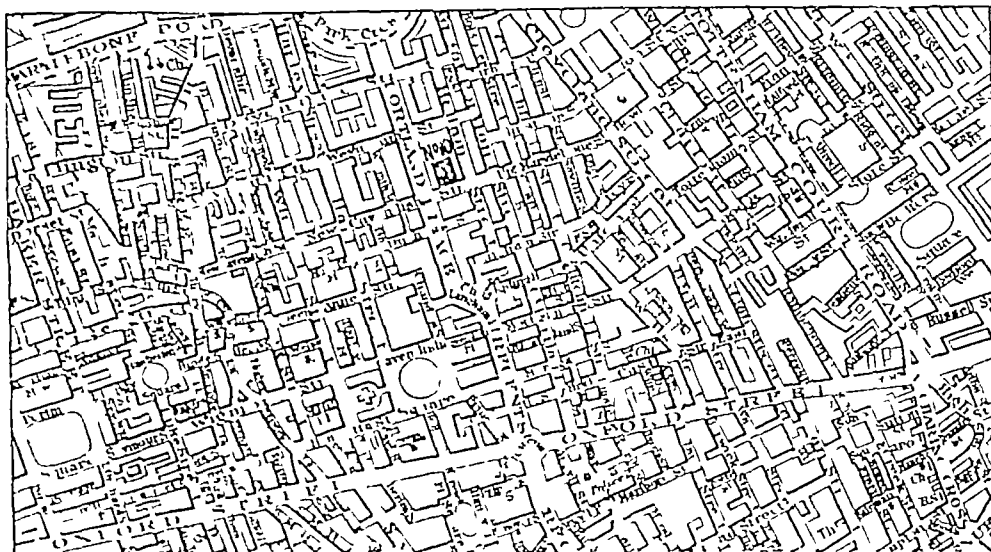
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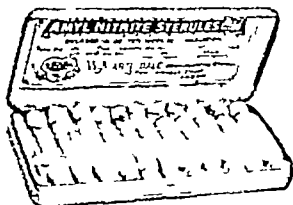
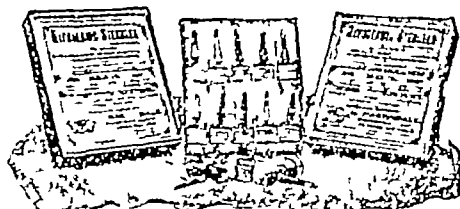
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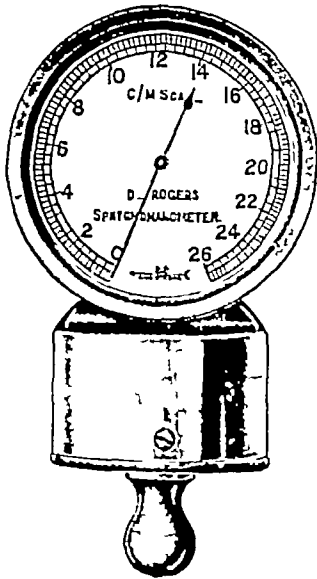
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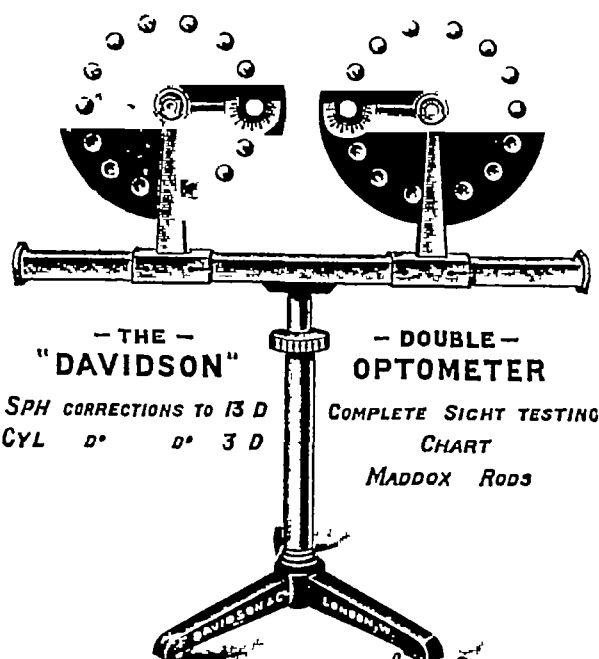
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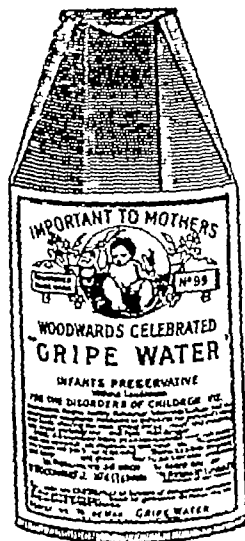
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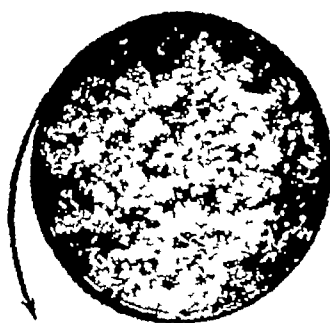
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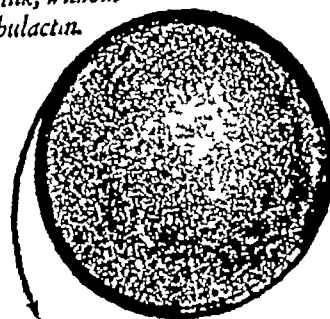
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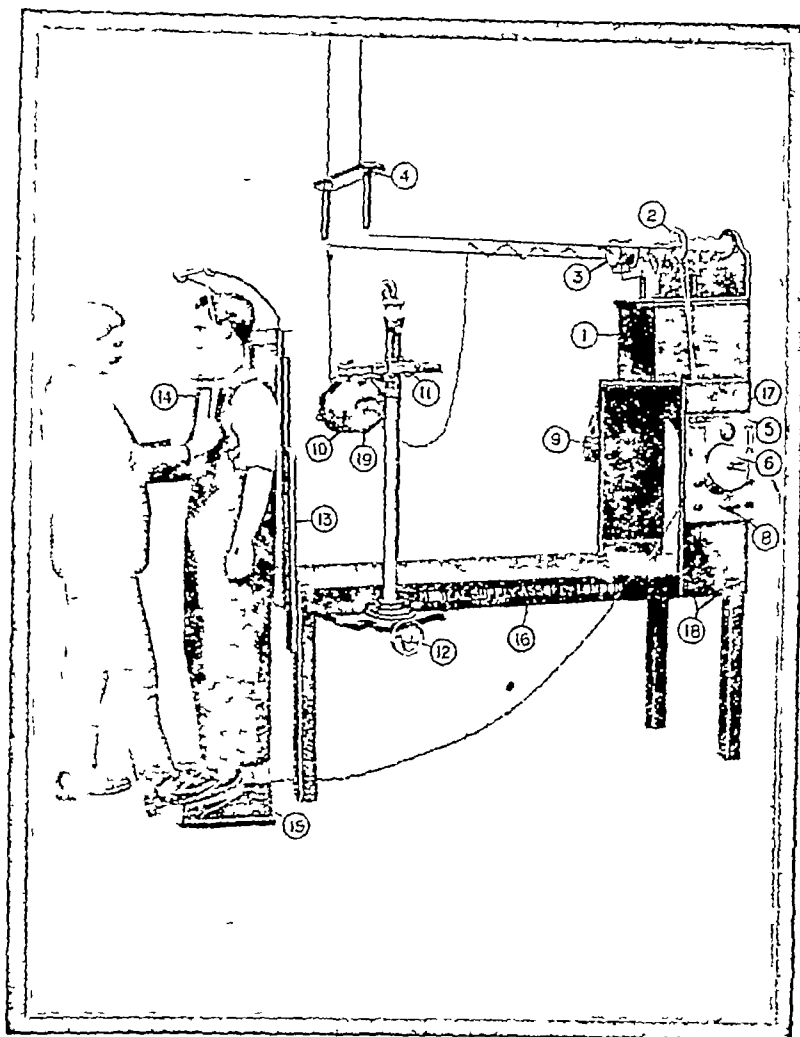
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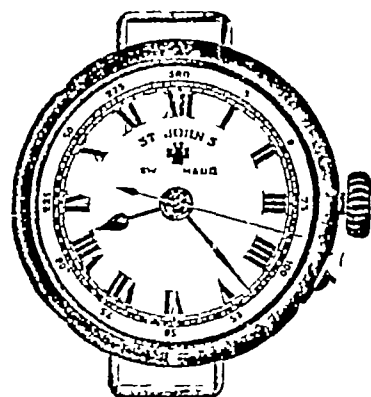
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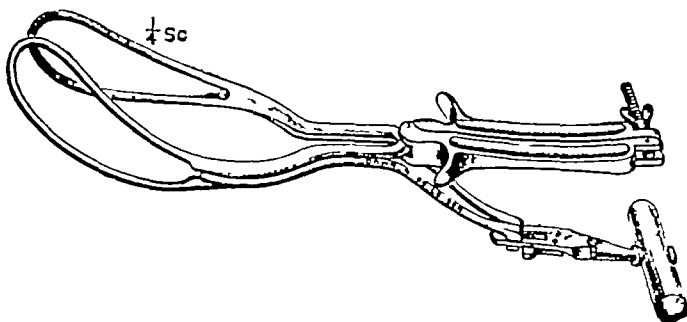
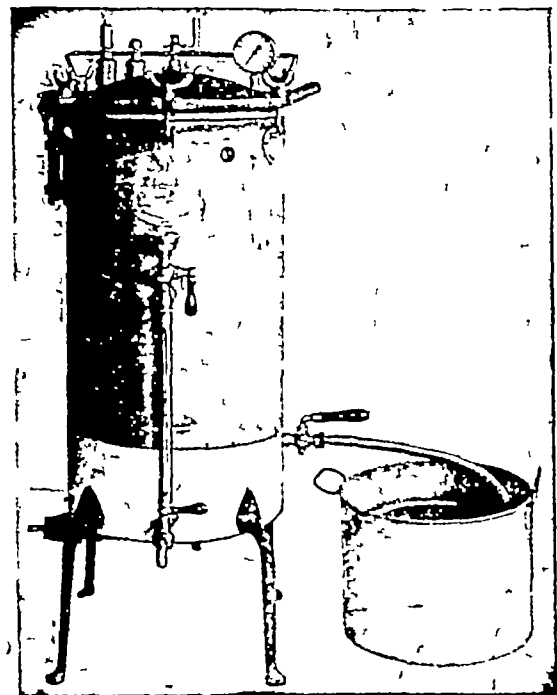
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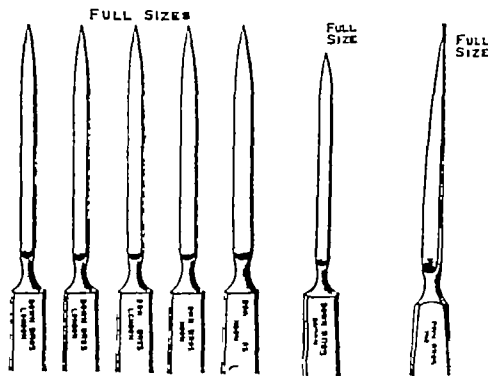
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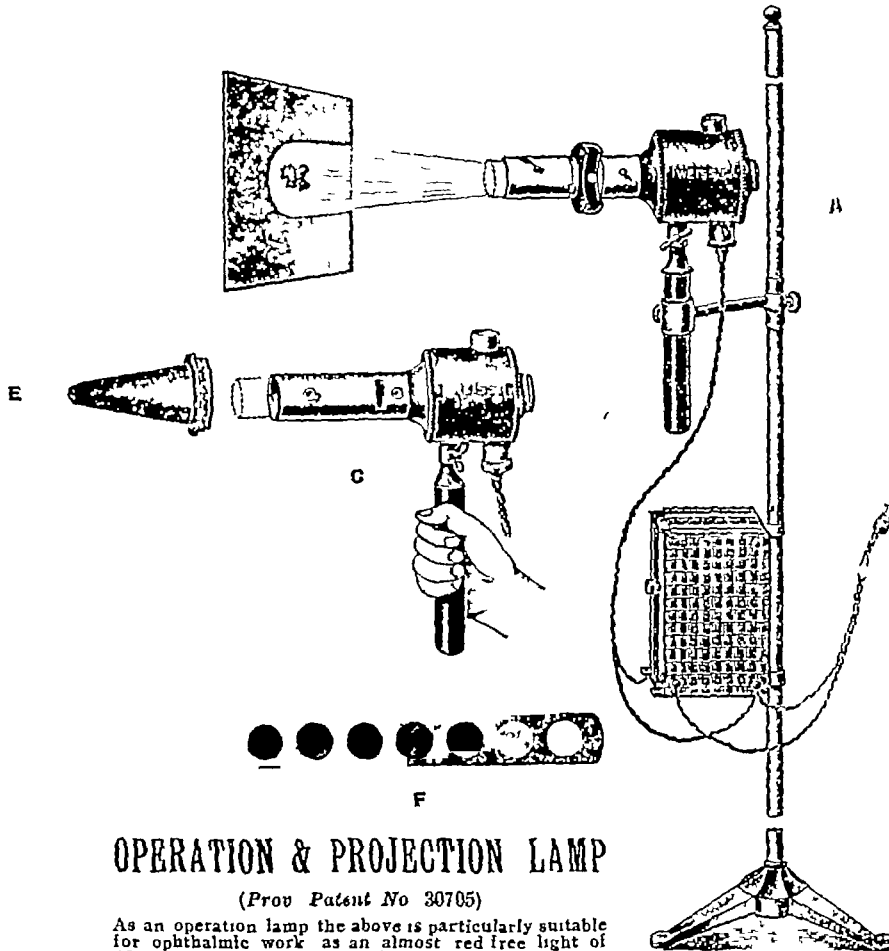
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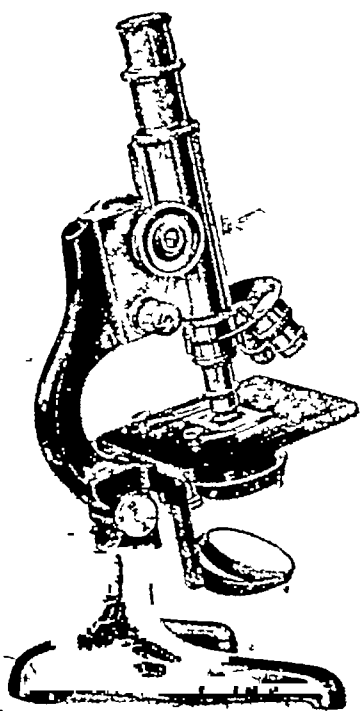
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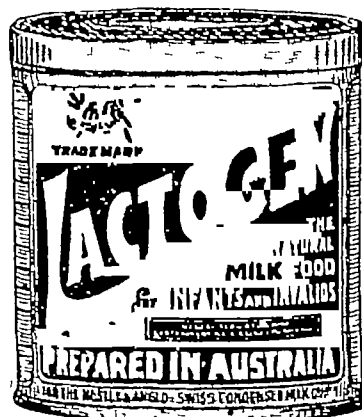
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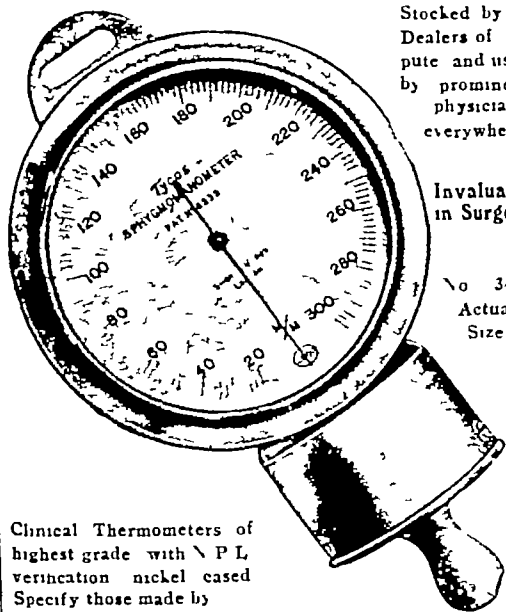
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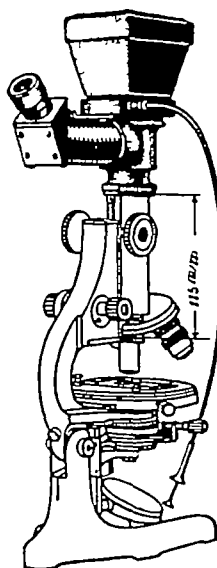
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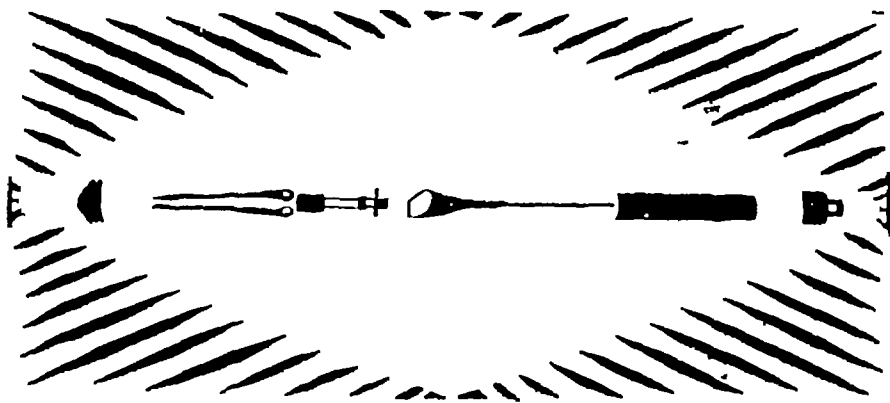
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# The why of Antiphlogistine in Infected Wounds



**E**VEN in the case of contused wounds, a definite call is made on the leucocytes, for their help of inhibition, and in the much more dangerous situation of badly incised or lacerated wounds, very strenuous duty is placed upon these policemen—scavengers of the blood—a call and duty that demand instantaneous response

*Antiphlogistine helps Nature's reparative action and checks infection*

It accomplishes the former through greatly increasing leucocytosis, thus tending to wall out infection by increasing the serous exudate and favoring the production of antibodies, upon which the healing of every wound actually depends.

Simultaneously, by endosmotic action, it is flushing the infected area with its non-irritant antiseptics of eucalyptus, boric acid and gaultheria

Apply the Antiphlogistine like a poultice, not like an ointment. Heat a sufficient quantity, place it in the centre of a gauze square, cover the affected part completely with the Antiphlogistine, and bind snugly with a bandage

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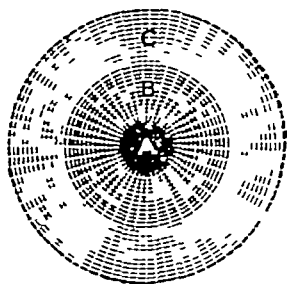
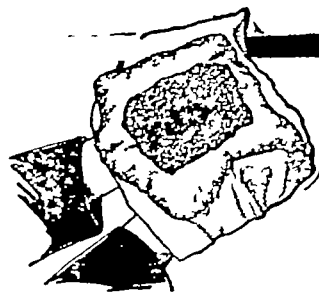


Diagram represents inflamed area. In zone "C" blood is flowing freely through underlying vessels. This forms a current away from the Antiphlogistine, whose liquid contents, therefore, follow the line of least resistance and enter the circulation through the physical process of endosmosis. In zone "A" there is stasis, no current tending to overcome Antiphlogistine's hygroscopic property. The line of least resistance for the liquid exudate is therefore, in the direction of the Antiphlogistine. In obedience to the same law exosmosis is going on in this zone, and the excess of moisture is thus accounted for



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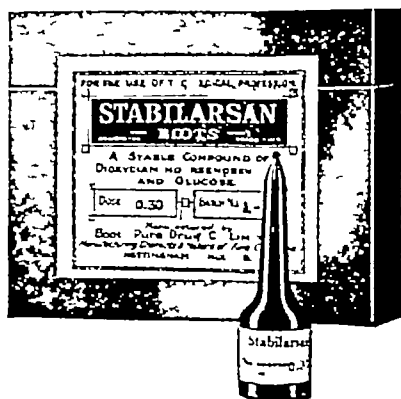
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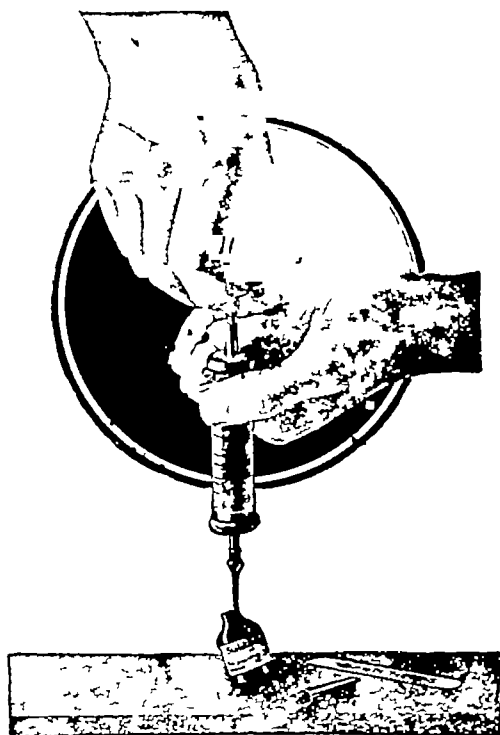
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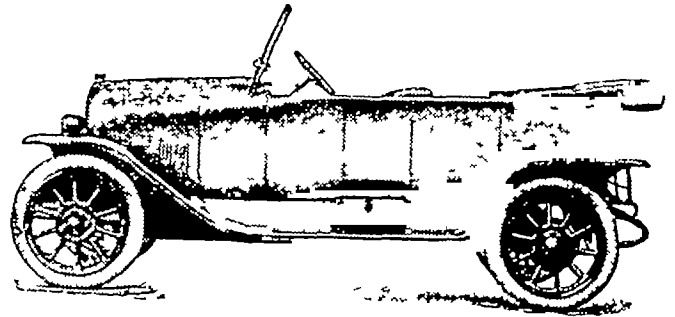
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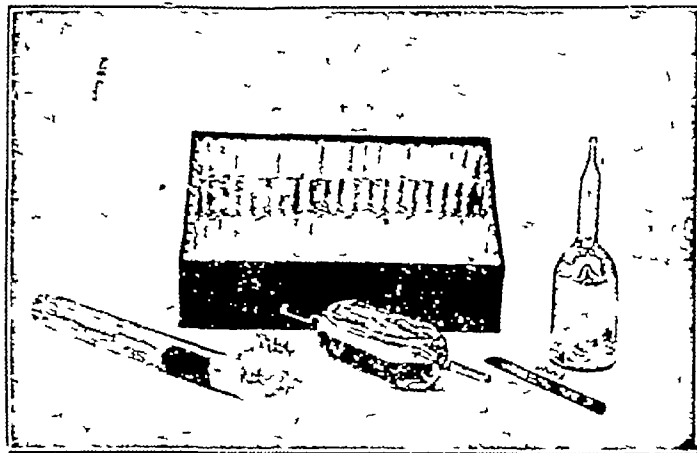


Fig 1

## THE OUTFIT (Fig 1)

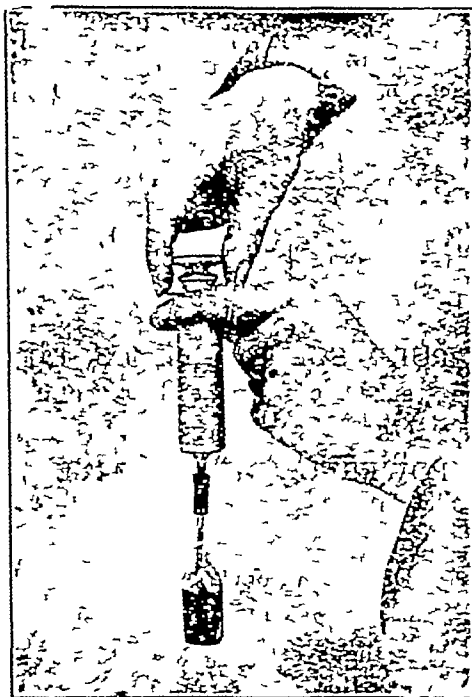
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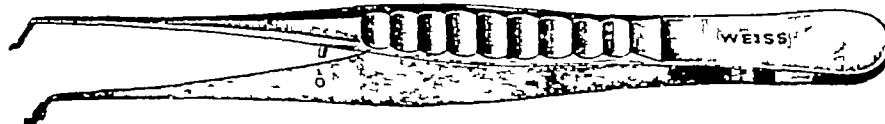
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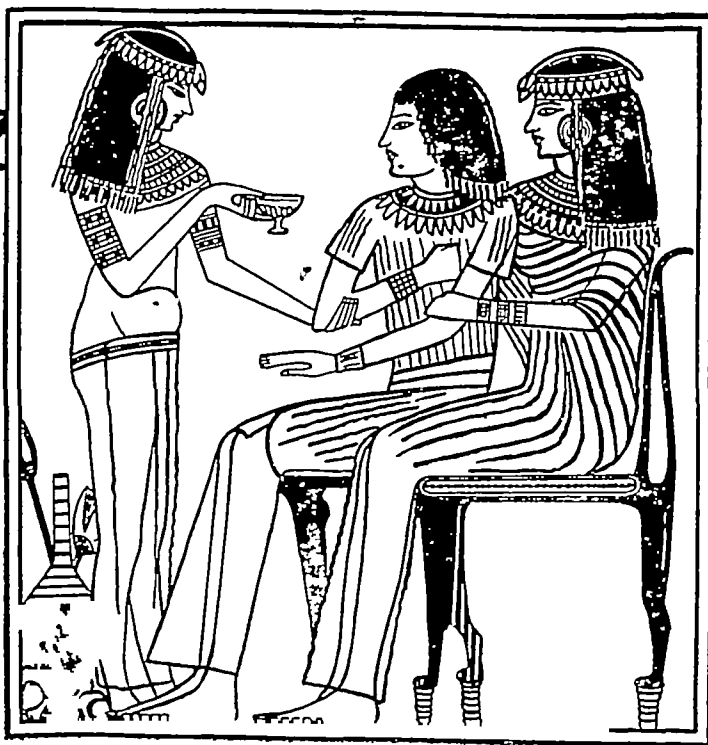
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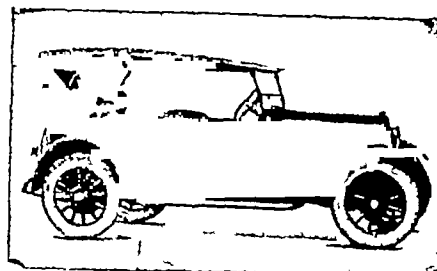
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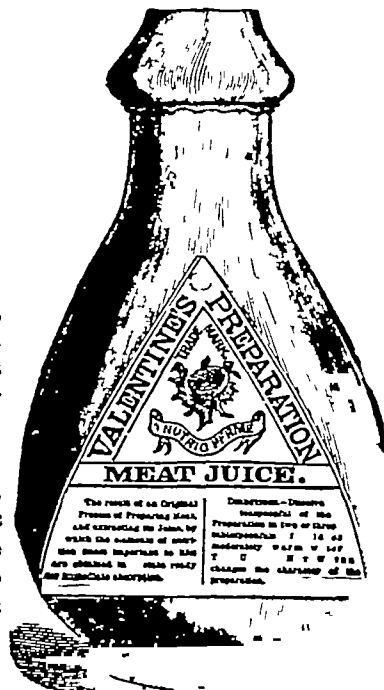
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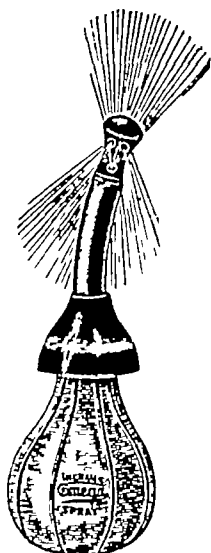
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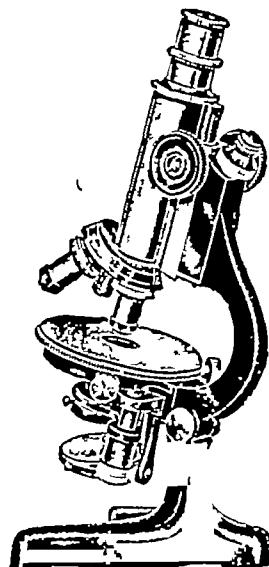
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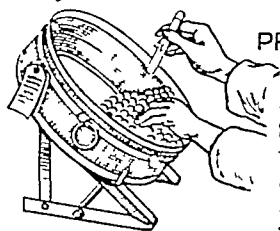
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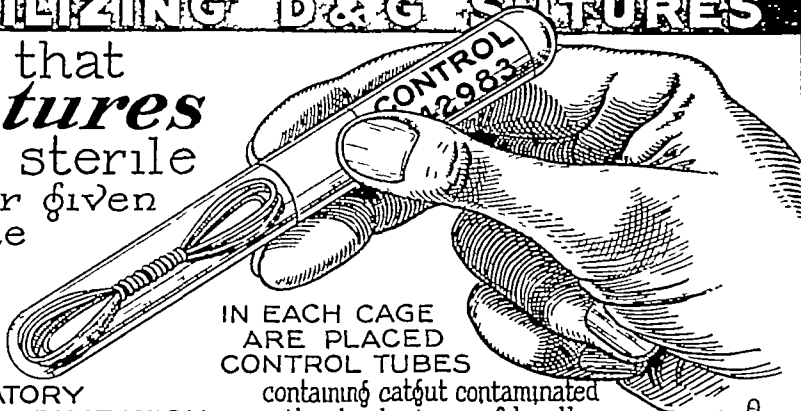


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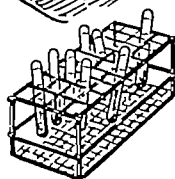


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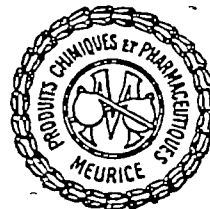
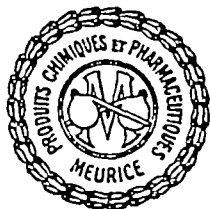
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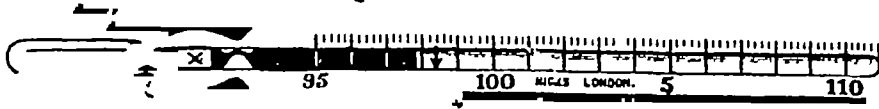
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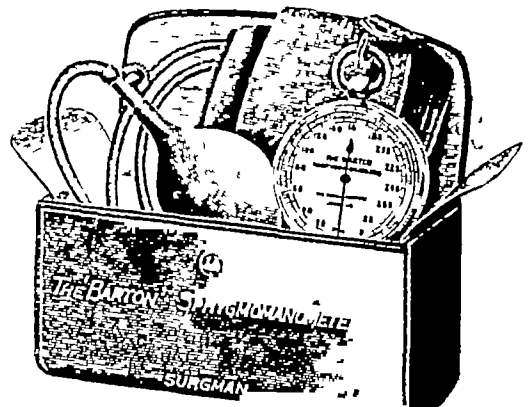
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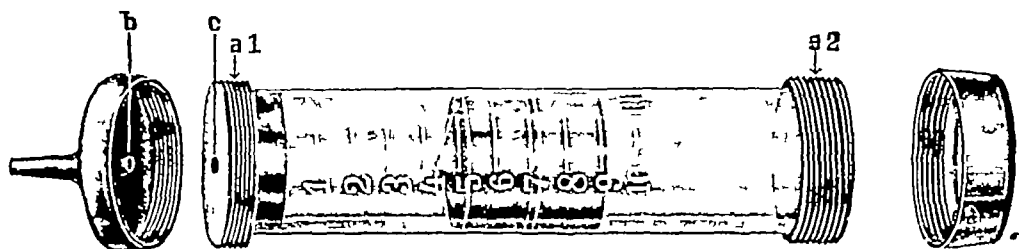
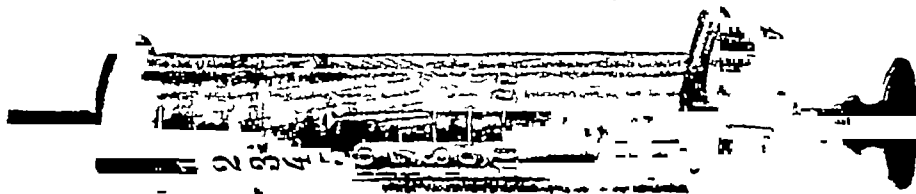
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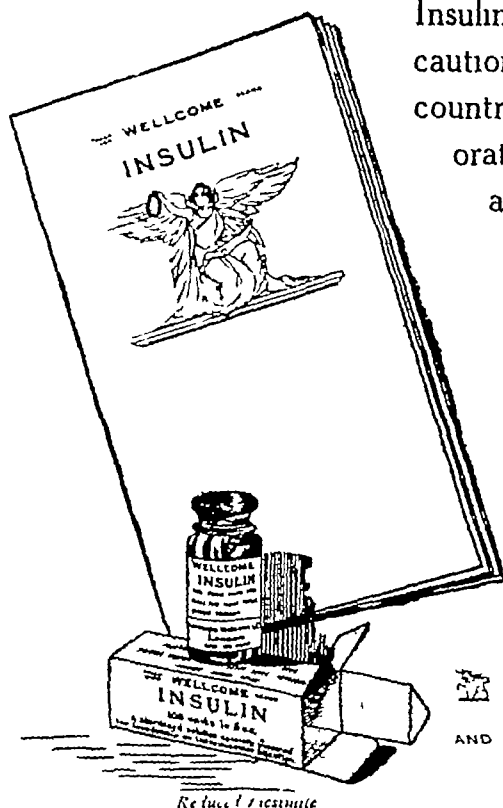
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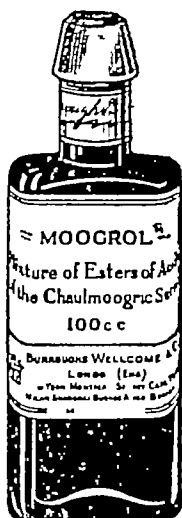
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*Jnl A M A Jan. 22 1921 p* 248  
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## Original Articles.

### ON THE RESULTS OF ANTI-MALARIA MEASURES IN FIVE TOWNS IN THE UNITED PROVINCES

By J A S PHILLIPS, D P H,  
MAJOR, I M S,

*Assistant Director of Public Health  
(Malariaology), United Provinces*

(Continued from the I M G, May 1924, page 228)

#### III KOSI

In the year 1910, Captain J D Graham, I M S, who was then employed as Special Malaria Officer, United Provinces, was deputed to visit and report upon the town of Kosi, to state how far its unhealthiness was due to malaria, and to make such recommendations as would tend to bring about an improvement in the health of its inhabitants.

His findings, summarised briefly, were as follows—

(1) That from a study of the vital statistics of the town of Kosi it was clear that there was a steadily increasing mortality for which malaria was considerably responsible.

(2) That the infantile mortality was high.

(3) That the death rate exceeded the birth rate.

(4) That the spleen index amongst children was very high, i.e. 81.3 per cent.

(5) That the parasitic index, i.e. the percentage of blood films taken from unselected cases in which parasites were present, was 26 per cent.

(6) That malaria was worse on the periphery of the town than at its centre, and worst in the area immediately adjoining the canal.

(7) That the main breeding grounds of the carrier type of anopheline mosquitoes were—

(a) The Main Canal

(b) Certain portions of the Ganda Nala and Petter Kund and disused and partially used wells.

Captain Graham's recommendations were as follows—

(1) That the bottom of the canal between miles 54½ and 56 should be carefully levelled and sloped towards the centre, along which there should be a V or U-shaped cunette.

(2) That the banks should be kept free of grass during the rains.

(3) That the canal should be flushed once weekly during the rains when the water in the canal was cut off.

(4) That disused wells should be filled in and those partially used should be suitably screened.

(5) That the syphon which conveys the water in the Ganda Nala under the canal should be enlarged so as to obviate the blocking and consequent flooding of the adjacent land which occurs from the Ganda Nala during the rains.

(6) The filling up or draining of certain tanks or Kunds which were found to be breeding anopheline mosquitoes of the carrier type—as also of the borrow pits found to be breeding anopheline mosquitoes.

On the 11th May, 1912, a Committee met to consider the whole question and to devise ways and means for carrying out the recommendations made.

The Committees' recommendations, summarised briefly, are as follows—

(1) That the canal bed for about 2½ miles in the immediate vicinity of Kosi (i.e. from mile 53½ to 56) should be made waterproof, and that the bottom of the canal for two miles should be cunetted.

(2) In addition the canal department should flush the canal at intervals of not more than eight days.

(3) That the proposed fall in the canal at mile 61 should be made at mile 54 furlong 4 instead, which would result in the lowering of the bed at this point by 2.25 feet. This would enable the main Kosi drain to enter the canal itself, the result being that the Kosi town area would be drained in a few hours.

(4) The realignment of the Kosi branch drain which disposes of the storm water in the surrounding country.

(5) All tanks and depressed areas to be filled up to a level at which they could be effectively drained.

(6) The Ganda Nala to be regraded, lined with masonry with a small cunette at its base.

(7) The railway authorities should be asked to fill up all existing borrow pits and excavations within their boundaries to a level at which they can be effectively drained for a distance of ½ mile north and south of the inhabited area.

(8) Disused wells should be filled and partially used ones should be suitably screened.

A grant of money was made by the Government of India to carry out these recommendations and the work was commenced. For various reasons and after much correspondence, recommendations Nos 1, 2 and 3 were finally abandoned.

Items 4, 5 and 6 were reported as having been completed on 31st December, 1915, and Nos 7 and 8—the latter only so far as the disused wells were concerned—were also carried out.

It will be seen, therefore, that the most important of the recommendations made were not carried out.

Dealing now with the effects of the anti-malarial works carried out at Kosi —

As the main breeding ground has received no treatment one would not expect to find any considerable improvement in the health of the town, and on an examination of the vital statistics for the decade 1913-1922 this would at first appear to be the case

The population of the town has still further diminished, whereas at the census taken in 1911 the population was estimated to be 7,188, in 1921 it had fallen to 6,753

For purposes of comparing the figures for the total mortality and total birth rate during this decade with those given by Captain Graham for the period 1880-1909, the following table has been prepared —

TABLE I

Decade	Total mortality per mille	Birth rate per mille
1880—1889	36.73	29.22
1890—1899	50.62	42.58
1900—1909	74.04	36.00
1913—1922	56.52	51.89

It will be seen at a glance that there has been a considerable increase in the birth rate during the latter decade and this in itself points to a lessened malaria incidence, as it is a well known fact that malarial fever has an adverse effect on the birth rate

The death rate is higher than in any of the other decades given in Table I, except that of 1900-1909. It might be argued that in this decade the death rate was put up by the ravages of plague—but against this in the decade 1913-1922 influenza was raging in India during the years 1917-1918 and 1919,—particularly 1918

Table II is interesting as in it I have taken the average figures for nine years of the decade 1913-1922, and have also given the figures for 1918 (the bad influenza year) separately

TABLE II

Decade	Total mortality per mille	Birth rate per mille
1880—1889	36.73	29.22
1890—1899	50.62	42.58
1900—1909	74.04	36.00
Average for 30 years 1880—1909	53.79	35.93
1913—1922	56.52	51.89
Average for 9 years 1913-1917 and 1919-1922	51.93	52.93
Figures for 1918 only	137.87	38.81

Several interesting facts will be noticed in the above table

(a) That the birth rate during the nine

years 1913-1917 and 1919-1922 actually exceeded the death rate by 1 per mille

(b) That the death rate in 1918 was really  $2\frac{1}{2}$  times as great as in the average for the decade 1913-22 and more than  $2\frac{1}{2}$  times as great as the average for nine years of this decade excluding 1918

(c) That the birth rate in 1918 was considerably lower than the average for the ten years 1913-1922

The total number of births in 1918 was 279 and the total mortality reached the enormous figure of 991, i.e., the deaths exceeded the births by 712

The average total number of deaths for nine years of the decade 1913-1922 (i.e., excluding 1918) was 415. This average figure is inclusive of deaths from influenza in 1917 when the total mortality was 578 and in 1919 when it was 530. Deducting this average figure from the total mortality figure for 1918, i.e., 991, it is found that there were in this year 576 more deaths than the average for the other nine years of the decade

The drop in the population at the 1921 census of 435 is therefore, readily explained by the enormously high mortality figure for 1918

Turning next to evidence of endemic malaria, a marked improvement is at once noticed

*Spleen index*—In 1910 Captain Graham examined 964 children at Kosi and of this number 784 or 81.3 per cent of them had enlarged spleens. In 1923 I examined 480 children of whom 204 or 42.5 per cent had enlarged spleens. These figures are best compared in tabular form —

Year	Number of children examined	Number with enlarged spleens	Percentage with enlarged spleens
1910	964	784	81.3
1923	480	204	42.5

A careful record was kept of the exact location from which the children I saw came so as to be able to compare the figures for the various areas into which Captain Graham had divided the town of Kosi with those obtained by him for these areas in 1910

TABLE III

*Shows this comparison*

Areas	Spleen rate in 1910	Spleen rate in 1923
A	88.1	46.5
B	83.9	38.6
C	90.9	50.7
D	82.09	52.4
E	78.5	39.3
F	82.4	37.2
G	77.6	37.0

But in a town of the size of Kosi, which is about a mile long and half a mile broad, the division of it into areas is hardly of the same significance as it is in a larger town covering a longer and wider area.

Captain Graham was of the same opinion and writes—"In a town so small as Kosi however I hardly think one is justified in putting much stress on the small differences of the individual areas and I am rather of opinion that we have here a town where the incidence of infection is very generalized both amongst all social strata and in every mohalla."

Looked at either way i.e., the figures for the town as a whole or separately for each area, the spleen index has diminished by approximately 50 per cent.

*Parasitic index*—Captain Graham in 1910 examined two series of blood films taken from unselected cases. In the first series he found parasites in 26 per cent of the slides examined and in the second in 20 per cent. In 1923 blood films taken similarly from unselected cases showed parasites in only 6.5 per cent of the slides examined.

In tabular form these facts are shown as under—

Year	Number of slides examined	Percentage with parasites
1910 1st series	100	26.0
1910 2nd series	87	20.0
1923	61	6.5

It will thus be seen that although the main breeding ground mentioned in Captain Graham's report has received no attention, the carrying out of the other measures he recommended has brought about a considerable improvement.

Is there not sufficient justification in the results already obtained for the reconsideration of the whole question as to the advisability of dealing with the canal bed as recommended by Captain Graham?

A great improvement has been brought about by what has already been done but the spleen index is still enormously high and Kosi must still be regarded as a very malarious town.

#### IV MEERUT

In the year 1911 Major Graham, I.M.S. Special Malaria Officer, United Provinces was deputed to investigate and report on the cause of the continued fall in the population of Meerut during the past 32 years, and how far this drop in the population was attributable to malaria.

As a result of his investigations he submitted a very complete and comprehensive

report which summarised very briefly, was as follows—

(1) "The vital statistics of the city indicate a high death rate, which, though showing undoubted evidence of a high percentage of malaria in the first two decades, has in the last decade shown a comparative drop in the percentage of malaria. (This investigation covered the period 1878 to 1911.) In this decade, however there has been a high mortality from plague which has been responsible for the continued diminution of the population.

(2) Epidemic malaria has appeared at wide intervals, but the mortality from it has not affected the city severely.

(3) Endemic malaria exists as proved by vital statistics, spleen census and endemic index but cannot be said to have been severe within the past few years, and seems to be diminishing.

(4) The total spleen rate is 5.9 per cent, the lowest area being round the tahsil in the centre of the city.

(5) The parasitic index is 6 per cent in a series of films taken in October 1911.

(6) The city shows a distinctly more severe infection on the east, south-east, and south aspects, than anywhere else.

(7) In close proximity to the area of severe infection are the principal carrier anopheline breeding grounds, i.e., the Abu Nala, Suraj Kund and Victoria Park pools."

Major Graham's recommendations, summarised briefly, are as under—

(1) The Abu Nala is the most important breeding ground of carrier anophelines and therefore the one that requires primary consideration. The main reason why this nala becomes a breeding ground is because of the inadequate and irregular flushing it receives, and during August, September and October the flush is suspended altogether.

He recommended—

(a) A twelve hour or even a six hour flush once weekly all the year round.

(b) The construction of a *pucca* cunette.

(2) The Suraj Kund is a large *pucca* stone tank whose west side is built over with temples. Much lotus and coarse vegetation is allowed to decay in it without any attempt at cleansing, the decaying matter gives shelter to mosquito larvæ. The tank should be cleared of all vegetation and no more aquatic plants should be introduced into it.

(3) Victoria Park tank should be filled to a level at which it could be drained into the Abu Nala.

(4) The filling, or draining, or both, of certain other proved breeding grounds of carrier anophelines.

Work on the lines laid down in these recommendations was started in 1915,

The banks of the Abu Nala have been made *pucca* for a considerable length of its course

The Suraj Kund was cleared of vegetation and when I saw it in August 1923, although there was a certain amount of aquatic plants in it, it was comparatively clear

The Victoria Park tank has been partially filled—but still requires a little further filling to ensure of drainage into the Abu Nala This, I was informed, is to be done shortly and funds are available for the purpose

Several other breeding grounds have also been filled

*The effect of these measures on the health of the town*—The first point that strikes one's attention is that there has been an increase in the population of Meerut city, that, whereas the population at the census taken in 1911 was 76,351, in 1921 it was 77,711, and this in spite of the fact that in 1918, owing to the high mortality from influenza, the total number of deaths reported was almost double that of the average total mortality for the other nine years of this decade, i.e., the total number of deaths in 1918 was 5,576 but the average for the other nine years of the decade was only 2,978

So that whereas in 1911 it was shown that the population of Meerut was diminishing and had been diminishing for over three decades, since that date it has increased

The average birth rate per mille of the population in the decade 1913-1922 was 40.10, and the average death rate during the same period was 35.30. The birth rate, therefore, exceeded the death rate by 4.80 per mille per annum

In tabular form and for purposes of ready comparison with the statistics given by Major Graham in his report in 1911 these facts will be readily appreciated in the following table—

TABLE I

Decade	Total mortality per mille of population	Birth rate per mille
1878-87	37.84	41.18
1888-97	32.63	39.33
1898-07	47.60	42.13
1908-11	40.76 (average for period)	37.16 (average for period)
1913-22	35.30	40.10

It will be seen at once that the death rate during the decade 1913-22 is lower than in any of the other periods shown above with the exception of the decade 1888-97. The latter decade was the only other one in which the birth rate exceeded the death rate

How far this improvement in the health of Meerut City can be attributed to the anti-malarial works that have been carried out

there it would be difficult to say. But that these measures have brought about an improvement in the amount of endemic malaria, as evidenced by the number of children with enlarged spleens, the following facts will prove—

In 1911 Major Graham examined 5,494 children of whom 325 or 5.9 per cent of them had enlarged spleens. In 1923 I examined 3,126 children out of whom only 41 or 1.3 per cent had enlarged spleens

A careful record was kept of the locality from which the children examined came so as to be able to make a comparison of the figures obtained in 1923 with those recorded by Major Graham for the various areas into which he divided the city. The following table shows this comparison—

Areas	Percentage with enlarged spleens, 1911	Percentage with enlarged spleens, 1923.
A	18.9	2.4
B	10.4	1.8
C	16.4	1.4
D	4.7	0.5
E	5.8	1.2
F	7.3	Nil
G	4.4	0.9
H	4.0	1.5
K	2.5	1.3

*Parasitic index*—Major Graham in 1911 examined blood films taken from unselected cases and found parasites in 6 per cent of the slides examined. In 1923 slides similarly examined from unselected cases showed parasites in only 3 per cent examined

It will thus be seen that the anti-malarial measures carried out at Meerut have resulted in a considerable improvement in the health of the inhabitants as far as malaria is concerned, and since there has been a reduction in the total mortality in the town it is reasonable to assume that some portion of this improvement can be ascribed to the lessened incidence of malaria. Malaria in itself is not a very fatal disease, but by lowering the vitality of its victims it renders them less capable of withstanding the effects of other and more fatal maladies

## V LUCKNOW

In the report on civil hospitals and dispensaries for 1912 the town of Lucknow was described as "pre-eminently the most malaria-stricken town in the provinces," and as a result of these remarks Major Graham, who was then Special Malaria Officer of these provinces, was deputed to investigate and report on the town

In a very detailed and comprehensive report of his investigations, which were begun early

in the monsoon of 1913, Major Graham was able to prove that Lucknow could not be regarded as a malarious town (1) He states "from all the evidence adduced the writer is of opinion that Lucknow is not at present a malarious city, and the original conclusions derived from the clinically recorded malarial figures would appear to be erroneous. Some of the other conclusions he arrived at and was able to prove were as under —

(2) About 1/10th of the verified fever deaths (i.e., about 1/30th of the total mortality) were due to malaria. As a cause of mortality malaria has, therefore, affected the city very lightly.

(3) The spleen index of the city was 2.2 per cent which is a very low figure.

(4) Malarial parasites were found in only 7.4 per cent of 392 cases which had been diagnosed as malaria.

(5) Malaria was relatively more prevalent in the heavily populated wards along the river Gomti and in an area in the centre of the city near the water works.

(6) Many of the wells, spread over a large area of Lucknow, were found to be breeding *A. stephensi*, a proved carrier of malaria and the one responsible for most of the malaria in Bombay.

(7) *A. culicifacies* and *A. fuliginosus*, two more well known carriers, were found to be breeding near the river.

(8) That the Ghazi-Uddin Hyder Canal was also breeding mosquitoes in portions where the cunette had been badly damaged, resulting in pools and collections of water.

#### Major Graham's recommendations

(1) He recommended that a campaign should be started against open and disused wells. Disused wells were to be filled and ones in use suitably screened or stocked with larvæ-eating fish.

(2) As regards the river Gomti and the breeding grounds near it, it was considered that the periodical opening of the sluice gate of the weir, when the latter was completed, would wash most of the larvæ in the river down-stream and would also result in the drying up of pools and collections of water caused by the banking up of water above the weir.

(3) The damaged cunette in the Ghazi-Uddin Hyder Canal should be repaired and the banks of the canal cleared of grass and vegetation.

The Sanitary Board considered and discussed Major Graham's report and on 4th May, 1916, recommended that the level of the water in the Gomti should be lowered at the weir by 3 feet once a week for 24 hours.

It was hoped that this would have the effect of washing larvæ down-stream, and drying up most of the breeding grounds along the river bank and in the backwater above the bund.

Large accumulations of water in backwaters that could not be drained should be treated by petrolage.

As many disused wells as possible were to be filled up. On 26th September, 1919, the Chairman of the Municipal Board reported that almost all the blind wells in the town had been filled up.

Many pools along the course of the Ghazi-Uddin Hyder Canal were filled up during 1917, 1918 and 1919 and others were oiled regularly.

Major Graham prepared a series of tables giving details of the vital statistics of the town from 1878 to 1912.

For purposes of comparison Dr. Dube, the Medical Officer of Health, very kindly supplied me with similar statistics from 1914 to 1922.

Table I gives the annual birth rate and death rate for this period —

TABLE I

Year	Death rate	Birth rate
1914	38.16	41.16
1915	40.34	42.74
1916	34.78	40.99
1917	44.78	45.27
1918	73.90	38.35
1919	41.66	34.19
1920	40.80	38.75
1921	47.40	40.84
1922	39.28	44.49
Average for nine years	44.56	40.75

It will be seen at a glance that Lucknow did not escape the epidemic of influenza which in 1918 took its toll of the inhabitants of India.

Had it not been for this high death rate in 1918 the birth rate would have about balanced the death rate. The average figures for the eight years of this period (excluding 1918) are birth rate 41.05, death rate 40.90.

The high sickness incidence of 1918 as evidenced by the high death rate would appear to have had an adverse effect on the number of births in the year following, the birth rate in 1919 was only 34.19, the lowest on record for this period.

Thus is the statistician, who bases his forecasts on the law of averages, defeated. A severe epidemic one year will upset all his calculations.

Table II is one of comparison with some of the figures given by Major Graham in his original report

TABLE II  
*Average Annual Statistics*

Cycle	Average death rate	Average birth rate
1878—1887 (9 years)	43.98	38.27 (8 years only)
1888—1897	45.68	39.15
1898—1907	52.43	40.20
1908—1913	47.60	38.08
1914—1922	44.56	40.75
1914—1922 excluding 1918	40.90	41.05

It will be noticed that in spite of the high mortality from influenza in 1918, the average death rate for the period 1914-1922 is lower than any of those given by Major Graham, except in the cycle 1878-1887, and that the birth rate for this period is higher than any of other cycles given in this table.

If the statistics for 1918 are excluded from those for this period, as has been done in the last line of the above table, the comparison is even more marked.

How far this improvement in the general health of Lucknow can be ascribed to measures taken principally to combat malaria it is difficult to say, as Major Graham proved conclusively that malarial fever was responsible for only a very small number of the deaths recorded annually.

But that these measures have brought about an improvement in the amount of endemic malaria, the following facts based on a spleen census of children between 2 and 10 years of age, will prove —

In 1913 Major Graham found 22 per cent of the children he examined had enlarged spleens. In 1923 under precisely similar conditions and at the same period of the year I examined 4,034 children and only 66 or 1.6 per cent of them showed enlargement of the spleen.

A careful record was kept of the wards from which the children came so as to be able to compare the figures obtained in 1923 with those Major Graham found in 1913 and Table III shows this comparison —

TABLE III  
*Spleen Index*

Wards	Year 1913	Year 1923
Wazirganj	16	0.8
Ganeshganj	16	1.6
Hazratganj	10	1.5
Yahiaganj	23	1.1
Saadatganj	24	1.8
Daulatganj	25	2.5
Chowk	29	2.3
Husainganj	31	1.4

It will be seen at a glance that a considerable improvement in the spleen index has occurred in Ward Husainganj. There has been a drop of 17 per cent in the number of children with enlarged spleens. This ward or portions of it, borders on the river, and it is obvious that the measures adopted to deal with the breeding grounds in the river and in its vicinity have been beneficial. Similarly there has been a reduction in the spleen index in the wards known as Wazirganj, Yahiaganj and Saadatganj, whilst Daulatganj, Ganeshganj, Hazratganj and the Chowk remain much as they were in 1913.

The reduction in the wards in which there has been an improvement is small, but when the spleen index in 1913 was found to be so low, it is gratifying to know that it is even still lower as a result of the anti-malarial measures carried out since that date.

*Parasitic index*—In 1913 Major Graham examined 346 blood films taken from patients diagnosed to be suffering from malaria at the various dispensaries in Lucknow and 46 films taken from children found to be suffering from enlarged spleens. Of this number only 29 or 7.4 per cent of them were found to contain malarial parasites.

In 1923, 341 blood slides from patients diagnosed to be suffering from malaria were examined and only 21 or 6.1 per cent of them had parasites.

It will thus be seen that although in 1913 it was proved that there was very little evidence of malaria in Lucknow and that the town could not be regarded as being malarious, there is evidence to show that there has been a still further reduction in the amount of endemic malaria.

This reduction can only be explained as being the result of the anti-malarial measures carried out since 1913.

### SOME FACTORS IN INDIVIDUAL SUSCEPTIBILITY \*

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#### *Introduction*

DURING the last two years, we have been investigating certain diseases, e.g., asthma (Acton and Chopra, 1923), urticaria, etc., in which are

\* Being a paper read at a meeting of the Medical Section of the Asiatic Society of Bengal on the 12th of March, 1924.



observed individual peculiarities, such as the susceptibility of one person to the emanations from animals, e.g., horses, cats, etc., of another to certain foods, and so on. This susceptibility may be inherited or acquired during the life of the patient, and may be defined as the peculiar response shown by certain individuals towards certain bases, which are incapable of producing symptoms in a normal individual. The problem before us is to solve what constitutes this individual peculiarity.

During our experiments on the causation of epidemic dropsy, we obtained certain bases from diseased rice, and for a long time we were extremely puzzled at the varying results which we got amongst our experimental animals. Thus at one time one animal would give a typical reaction from our point of view, whilst the next day another animal of the same species would show no such effects after injecting these rice bases. At first we were inclined to attribute these varying results to slight alterations in the chemical processes of extraction employed by our colleagues in the chemical department. Finally we asked them to keep to one extraction process and not vary it in the least. In spite of this our results still varied, showing that we were dealing with some varying factor in our test animals. To settle this point, we tested these rice bases on two animals, and got diametrically opposite results. Thus one animal showed bronchial constriction, marked augmentation of the heart beat, and a considerable rise in limb volume, the other animal showed slight bronchial relaxation, a marked rise in blood pressure and no rise in limb volume. Before we could more fully investigate the relationship of these rice bases to epidemic dropsy, it therefore became necessary for us to find out the factors concerned in these individual variations.

These poisonous bases may get into the blood stream in one of the three ways, i.e., by —

(i) *Inhalation*, e.g., the hay or pollen fevers, and the asthmas of animal origin.

(ii) *Absorption*, usually from the alimentary canal, as in asthma, urticaria, and giant urticaria, more rarely from ulcerated surfaces, or mucous membranes, e.g., bronchial and intestinal asthma.

(iii) *Inoculation of foreign proteids*, e.g., serum sickness after the injection of horse serum and anaphylaxis.

The normal individual can deal with these poisons and so no symptoms are produced, but in certain individuals the same substances, whether inhaled, absorbed, or inoculated, produce sufficiently violent symptoms to cause disease. These abnormal reactions on the part of the individual are called in our ignorance of the phenomenon, idiosyncrasy, susceptibility or sensitiveness, and when the more complex proteids are concerned in its production are termed serum sickness and anaphylaxis. We have here a wide range of chemical substances commencing from the intolerance to small doses of drugs such as the iodides and bromides, quinine and the salicy-

lates to intolerance to the more toxic drugs such as quinine, pilocarpine and digitalis. Still more complicated are the protein bases derived from food, plants, and the toxins of bacteria producing such diseases as hay fever, asthma, and urticaria. Finally, the varying degrees of susceptibility produced by injecting foreign proteids, e.g., serum sickness after horse serum, or in sensitised persons, the graver cases of intense bronchial spasm, and oedema of the glottis, which sometimes ends in death are called anaphylaxis. In all these different conditions, observers are unanimous that there is a peculiar susceptibility present, but in the case of anaphylaxis some observers consider that a tissue enzyme is produced which is capable of splitting the proteins into toxic bases.

The treatment recommended for anaphylaxis is injections of adrenalin, with or without pituitrin, and clinically we find that this  $\text{NH}_2$  base also acts as a charm in many cases of asthma and giant urticaria, if administered early in the attack. Now the pharmacological action of adrenalin at first sight appears to be very evanescent, and we may ask ourselves the pertinent question, "How does this drug really act?" The answer to this question we hope to explain later.

Susceptibility or idiosyncrasy, is a phenomenon which may be —

(i) *Congenital*, i.e., an inherited gift of the species, thus man suffers from lathyrism, whilst cattle can eat *kesari dāl* (*L. sativa*) with impunity. The guinea-pig is the best animal in which to demonstrate anaphylactic shock, whilst man is the worst. Again, the particular species may be immune to a particular poison, e.g., man to emanations from domestic animals, yet here and there, there are individuals who inherit this disability from their parents and suffer from asthma from their early youth.

(ii) *Acquired*, i.e., individuals who have tolerated these bases all their lives, and then for some reason or other have suddenly developed a susceptibility towards them. In many cases, after leaving off the particular food or drug for some time, and then taking it again, a sensitiveness has been acquired during this period of rest. In others, the phenomenon can be traced to some defect of digestion, of liver function, or of the endocrine defence mechanism.

We can therefore study the phenomenon best from two different points of view by estimating —

(i) *The degree of variation in different animals of a particular species*

(ii) *The degree of variation in different species*, which correspond respectively to the acquired and congenital susceptibility.

Before proceeding any further we would like to express our thanks to Captain De, Assistant Professor of Pharmacology, and Mr N. R. Chatterjee, M.Sc., for their loyal help and co-operation during this long series of tedious experiments, when at times the problem seemed incapable of solution.

### The Endocrine Defence Mechanism

For over a year these experiments were conducted on a large scale, and the animals we used were cats. These animals varied in weight from 2,200 grammes to 2,600 grammes, and the blood pressure and respirations were always recorded, and also—depending on the point which we were investigating—the limb, spleen, or intestinal volume. The drugs chosen were (I) Tyramine, an amine obtained from ergot, in doses of 1 milligramme per kilo of body weight (II) Pilocarpine, the plant alkaloid obtained from the leaves of *Pilocarpus microphyllus*, in doses of 2 milligrammes per kilo of body weight (III) Adrenalin, in 0.1 c.c. doses of a 1 in 1,000 solution of the hydrochloride. The injections were made into the saphenous vein. Tyramine acts through the sympathetic and causes a rise of blood pressure by vaso-constriction, and relaxation of the bronchiole muscles. Pilocarpine through the vagus causes a great fall of blood pressure due to vaso-dilation, and stimulation of the bronchiole muscles. Adrenalin acts through the myo-neural junctions of the sympathetic, and causes a rise of blood pressure due to vaso-constriction, and a relaxation of the bronchiole muscle. We used adrenalin in the same way as Dale used histamine, as a standard test by which we could make comparisons. This point will be more fully described later on in the paper. In general terms we noted that if the adrenalin reaction was poor, these bases usually acted on the involuntary muscles of the blood vessels and bronchioles, whilst conversely, if the adrenalin reaction was marked, the bases did not produce their characteristic effects in these animals. It was obvious from these results that the endocrine secretions were closely concerned in the defence of the tissues against the action of these bases.

We next determined to study the secretions of those organs, that were concerned with the control of the sympathetic nervous system and plain muscle,—i.e., the thyroid, the suprarenals, and the pituitary gland,—as many of these protein bases act through the sympathetic.

### The Thyroid Gland

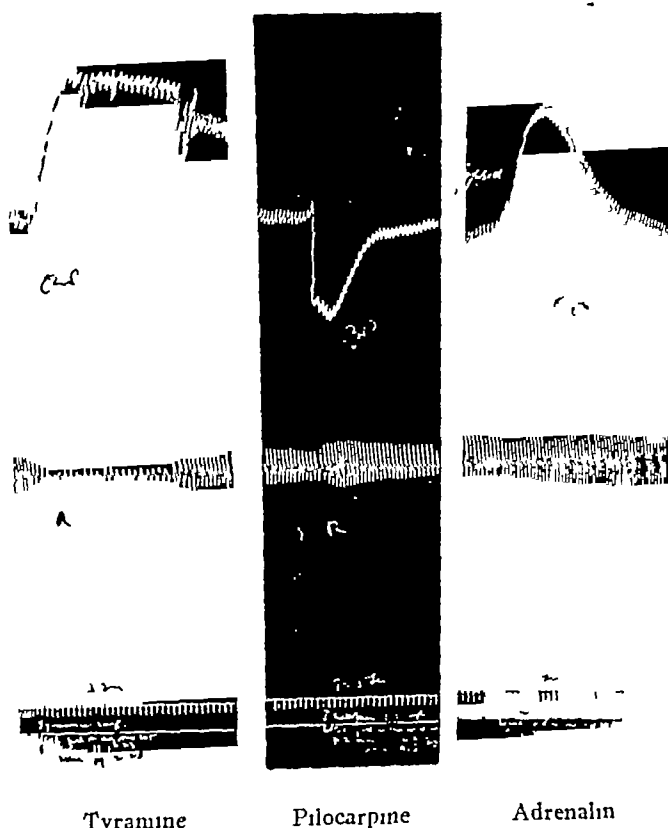
The action of this gland was first studied, because it is the most important of these three glands, and as Leonard Williams rightly maintains it is the conductor of the endocrine orchestra.

(A) *The action of these bases in the presence of an excess of thyroxin in the tissues.* The animals were fed for a week on fairly large doses of thyroideum sicum and then tested with the following bases (see Graph I).

Tyramine caused a sudden rise of blood pressure, which was sustained, but the amplitude was not much increased, the reaction resembling that produced by adrenalin. The bronchiole relaxation was slight and not sustained for long. With the spleen volume there was a marked

and persistent fall. Pilocarpine caused a sudden fall in blood pressure, with an acceleration of the heart beat, but a decrease in amplitude, the blood pressure did not rise higher than the normal on recovery and the bronchiole muscles

GRAPH I—HYPERTHYROID



were slightly constricted. Adrenalin hydrochloride caused a moderate rise in blood pressure with an acceleration of the heart beat, there was no relaxation of the bronchiole muscle. *Excess of thyroxin in the tissues therefore increases the action of these bases in their effects on the involuntary muscles of the arterial system by vaso-constriction, or vaso-dilatation, and under these circumstances they have little action on the bronchiole muscles.* Adrenalin and tyramine would therefore be of but little use in the treatment of acute attacks of asthma in hyperthyroid individuals.

(B) *The action of these bases in the absence of thyroxin in the tissues (hypothyroidism).* In these animals the thyroids were excised, and seven days after ablation they were tested with the three bases mentioned above. This interval of time was sufficient for all the thyroxin to have been utilised, and if all the parathyroids were not excised as well the animals survived, otherwise they died before the seventh day. These animals showed a delay in the healing of their wounds and were very prone to bacterial infections. The test drugs now gave a totally different picture to those we had already obtained in animals fed on thyroid (cf Graphs I and II). Tyramine now caused a marked and persistent rise of blood pressure, with an increase in the amplitude of the heart beat. The relaxation of

the bronchiole muscle was very marked and persisted for a long time. There was a marked fall of the spleen volume owing to constriction of the involuntary muscle in the spleen. Pilocarpine also caused a marked and persistent

tion of the bronchiole muscle but nothing like that produced by tyramine in these animals. The spleen volume showed a slight fall.

*In short, the absence of thyroxin from the tissues showed the following effects in these*

GRAPH II—HYPOTHYROIDISM



Tyramine.

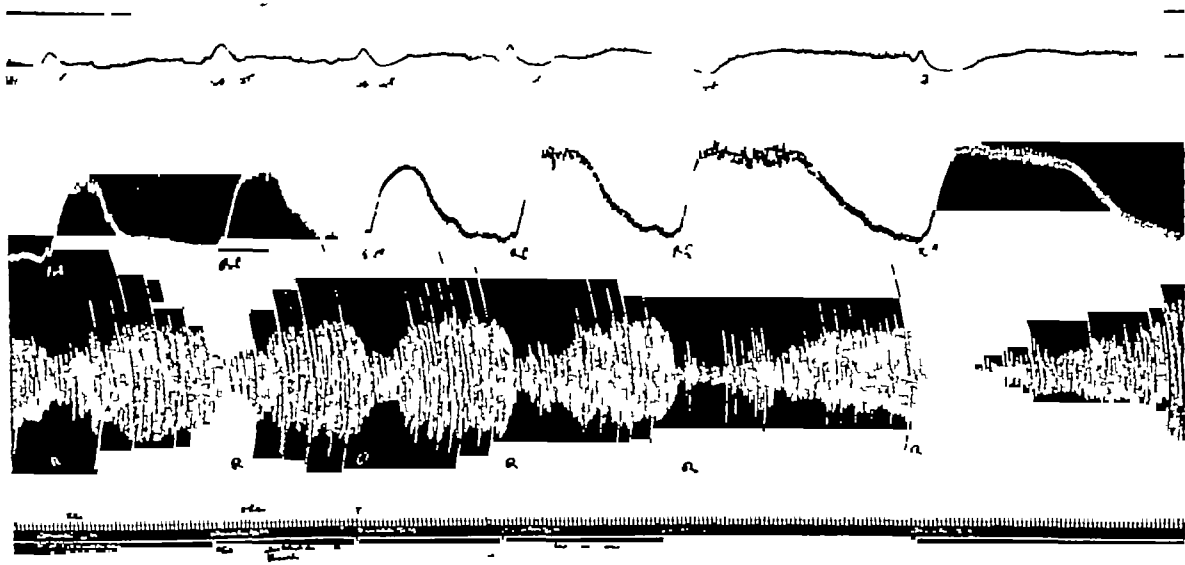
fall in the blood pressure, with a slight increase in the amplitude of the beats. Respiration was markedly accelerated and there was bronchiole constriction. There was also a marked fall in

Pilocarpine.

Adrenalin

animals (I) The involuntary muscles of the bronchioles react very violently to these bases, and tyramine becomes more powerful in its relaxor effect than adrenalin. (II) The effects on

GRAPH III  
Effect of repeated doses of Adrenalin



Adrenalin

Adrenalin

Adrenalin

Adrenalin

Adrenalin

Adrenalin

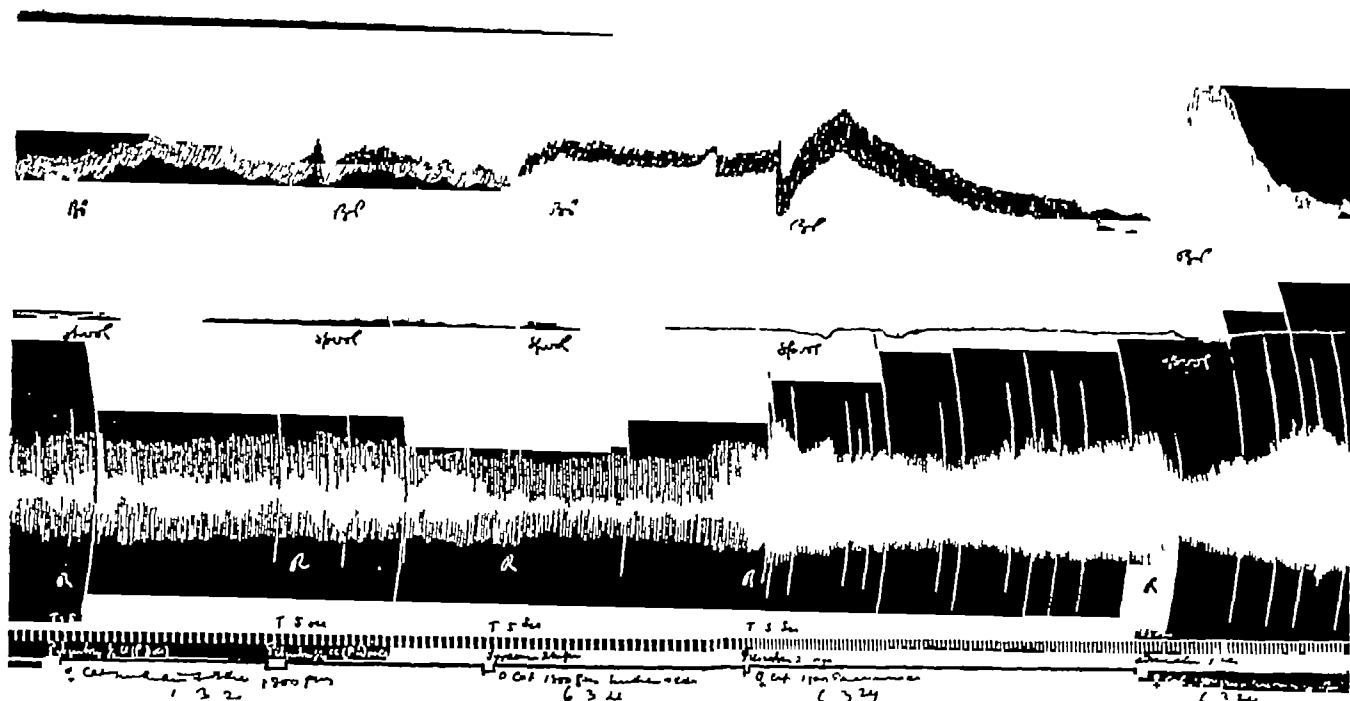
the spleen volume. With atropine, the relaxation of the bronchiole muscle was more marked in these animals. Adrenalin caused a marked rise in the blood pressure but there was no increase in the amplitude. There was marked relaxa-

tion of the bronchiole muscle but more persistent, thus applies as well to adrenalin, indicating that these animals have an excess of adrenalin (hyperadrenia). (III) In the absence of the thyroid which is the main stimulator of the sym-

Pituitrin therefore appears to increase muscular tone, steadies the amplitude of the heart beat

ly an excess of adrenalin in the tissues, e.g., Gotsch test. Again in myxœdema, the amount

GRAPH VI

Pituitrin  $\frac{1}{2}$  C C

Pituitrin

Tyramine

Pilocarpine

Adrenalin

after adrenalin, and increases the action of pilocarpine

*Summarising these results, we may state that these endocrine secretions are stimulators of the sympathetic nervous system*

One of the secretions of the pituitary gland is concerned with increasing the tone of the involuntary muscles of the body. Dixon (1923) showed that the output from this gland was rhythmic, as it was increased by the secretion from the duodenum, and by the ovarian hormones.

Adrenalin acts on the myo-neural junctions of the sympathetic nervous system increasing both nerve and muscle tone, its output is capable of being suddenly increased by various factors, e.g., fright, whilst it is soon destroyed or utilised by the tissues of the body. It is the mechanism by which sudden falls of blood pressure can be most easily compensated in health, whilst the sudden and often fatal falls of blood pressure that occur during operations, and anaphylaxia are sometimes averted by this base. An excess of adrenalin in the tissues (hyperadrenia) acts on the myo-neural junctions diminishing cell permeability and so inhibiting the action of many of these bases. An absence of adrenalin in the tissues (hypo-adrenia) deprives the body of this rapid defence mechanism. In the absence of adrenalin, as the defence mechanism of the sympathetic nervous system is now wholly regulated by the thyroid secretion, which is much slower in action than adrenalin, sudden deaths during operations etc., are commonly seen amongst these animals.

The thyroid gland largely controls the secretion of adrenalin from the adrenal gland, thus in hyperthyroidism (Grave's disease) there is usual-

ly an excess of adrenalin in the tissues, e.g., Gotsch test. Again in myxœdema, the amount of adrenalin in the tissues is also deficient. The secretion of adrenalin can, however, be in excess or diminished independently of the thyroid control.

#### *The defence mechanism against drugs ingested by the mouth*

We cannot consider all the chemical changes that may take place in the alimentary canal in detail, but will only consider two of them which we have specially studied during the course of this research.

(A) *The effect of the hydrogen ion concentration*. In a paper now in press "On the Vital Processes at Cell Surfaces," Acton has shown that the main effects which change in the hydrogen ion concentration has on the cell surface are (1) to alter the electrical conductivity, and (2) to alter the cell permeability. Osterhaut (1923) showed that in an excess of  $\text{—H}$  ions, the electrical resistance was increased and the cell permeability diminished, whilst when an excess of  $\text{—OH}$  ions was present, the electrical resistance was diminished and the cell permeability increased, in fact resistance and permeability were closely correlated with each other. We regard the chemical crystalloids with which we are dealing, as consisting of three classes: (I) Inorganic salts, which are active by virtue of their free ions, viz., electrolytes; (II) Organic bases, which depend largely on their rate of diffusion for their activity; (III) Ampholytes, which act either as bases or as acids and function best at their optimum pH.

In the stomach, where the pH is about 1.2 at the height of digestion and there is therefore an

excess of  $\text{—H}$  ions, we should find that the electrical conductivity is increased and the permeability is diminished, and the different effects will be shown by these crystalloids as follows. With inorganic salts, there will be a greater degree of ionisation, so that the salts of such metals as Hg, As, and Sb will irritate and damage the mucous membrane if given in sufficiently large doses. With organic bases such as for example quinine, although introduced into the stomach as a soluble diffusible chloride, if the quinine remains in the stomach, owing to the diminishing permeability of the gastric mucosa, very little quinine will be absorbed and reach the circulating blood. With ampholytes, the best and most striking example is botulin-toxin, where the action is enhanced from a minimum lethal dose of 0.3-<sup>0</sup> c.c. to one of 0.3-<sup>23</sup> c.c.

Osterhaut (1923) has more recently shown that an excess of  $\text{—OH}$  ions increases the rate of diffusion of certain chemical compounds through cell membranes. We have been studying this point more closely and find that large doses of alkalis do not materially alter the pH of the blood. On the other hand, the amount of quinine present in the blood is increased nearly three fold when its oral administration is preceded by large doses of alkalis by the mouth, or when it is injected directly into the ileum as a base. In such an alkaline substrate most of the inorganic salts would be relatively inert, and the ampholytes would only act as weak bases.

Osterhaut has shown that there are certain organic substances such as bile salts which diminish cell permeability, and this function of the bile salts is important in the case of the more soluble diffusible peptones and polypeptids, as this gives time to the erepsin of the intestinal mucous membrane to split them further into simpler harmless amino-acids or bases. It is probable that the bases (vitamines) obtained from rice polishings act in a similar way by diminishing cell permeability and preventing the bases from diseased rice entering the circulation. If any toxic bases leave the intestine to circulate in the blood they must pass through the liver before they arrive in the general circulation.

(B) *The defence mechanism of the liver* This mechanism may operate in one of the following ways. Recently we have been working with Dr Sudamoy Ghosh, D.Sc., on the hydrogen ion concentration of the different organs of the body, and this work will be published independently. We found that the liver was the most acid organ in the body with a pH varying between 6.2 and 6.8, depending on whether we were dealing with carnivorous or herbivorous animals. Theoretically under these conditions we would expect the various inorganic salts of As, Sb, Hg, etc., to ionise and be deposited in the liver tissue, and this actually does occur, for we know that in cases of poisoning these metals are found in the greatest concentration in the body in this organ. In such

an acid substrate many of the amines, betaines and alkaloids would appear to be relatively inert, as many of them act better in a pH between 7.2 and 8. In the liver there are certain ferments, oxidases, etc., which are capable of breaking down these poisonous bases into simpler and less toxic decomposition products. Ramsden and Lipkin (1918) considered that quinine was altered in this way into quitenene, a relative inert compound. Lastly we have the so-called adsorptive power, when simpler compounds are loosely bound physically to a complex protein molecule rendering inert such a poison, as only small quantities are liberated from time to time. A good example of this is carbon tetrachloride, where four times the quantity is required to produce a lethal effect when injected through the mesenteric vein as when injected through the jugular. Again, it has been found that carbon tetrachloride is more powerful when injected through a liver damaged with alcohol than when it passes through a normal liver (Chopra and McVail, 1923). These two factors, the pH of the intestinal tract and the defence mechanism of the liver, are of immense importance when poisons are ingested by the mouth or absorbed from the intestines.

We have therefore to consider three variable factors when drugs or poisons are taken by the mouth.

(I) *The hydrogen ion concentration*

(II) *The defence mechanism of the liver*

(III) *The endocrine defence mechanism*

and we are now in a better position to understand species and individual variations, which are usually spoken of as idiosyncrasy, susceptibility, etc.

#### *Variations in the individual*

The animals tested were chiefly cats. In these animals adrenalin gave three types of curves. (I) A slight rise in the blood pressure with slight bronchial relaxation. (II) A moderate rise in blood pressure, which tended to persist longer than (I), whilst the amplitude became very irregular, in these animals there was moderate bronchial relaxation. (III) More rarely, there was a high rise in blood pressure with no tendency for the heart to become irregular in action, and with marked bronchial relaxation. From the previous experiments with repeated doses of adrenalin (cf Graph III) it would appear that the cats with a small amount of adrenalin in their tissues would give a poor response to this drug (class 1), and animals with a large amount present in the tissues would give a marked response (class 3). On testing pilocarpine on these animals we got two types of response, (a) a fall of blood pressure which was not recovered from, with marked bronchial stimulation, or (b) a transient fall of blood pressure which was soon recovered from, and followed by a rise, with but only slight bronchial stimulation. Again from our experiments on thyroid-fed animals and thyroidectomised animals, we would say that the former animals (a) were hypo-thyroids whilst the latter animals

(b) were hyper-thyroids. Tyramine when tested on animals usually very closely followed the adrenalin reaction, thus when the adrenalin response was poor, tyramine caused a marked rise of blood pressure and bronchial relaxation, whilst when the adrenalin reaction was marked, tyramine had little effect in raising the blood pressure or relaxing bronchiole muscles. We therefore see that the action of these bases in different individuals of the same species is largely controlled by the secretions from the thyroid and adrenal glands.

#### *Variations in the different species*

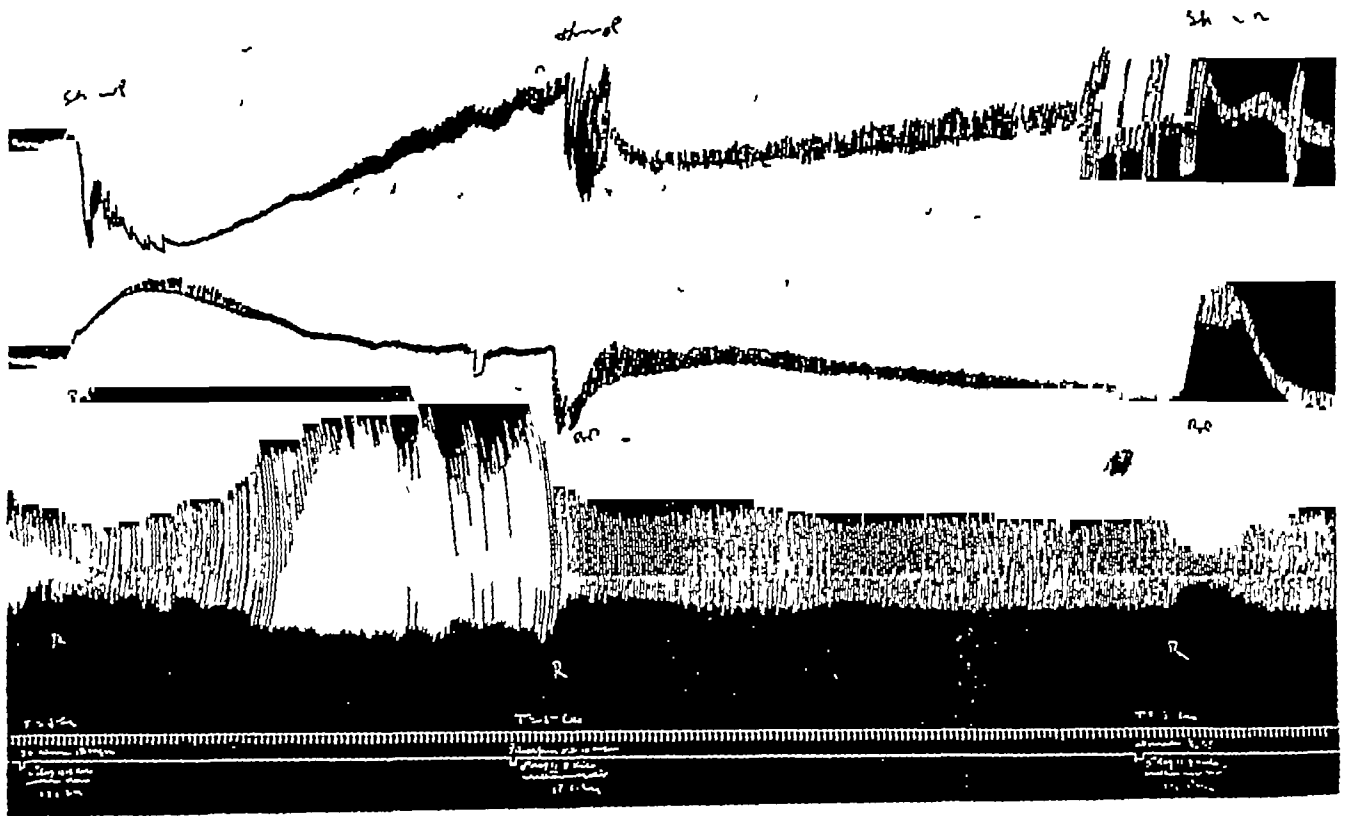
(A) *Dog*—In this animal the adrenalin response is nearly always poor (Graph VII) or sometimes moderate (Graph VIII).

nal response, which suggests that their adrenalin content is low, whilst the marked effect which these bases have on the circulation in dogs and the slight effect on respiration suggest that they are hyper-thyroids.

(B) *Monkey*—(Graph IX) In this animal adrenalin causes a marked rise of blood pressure and a marked increase in the amplitude, there is slight relaxation of the bronchiole muscles, and the movements of the intestinal muscles are decreased. Tyramine causes a very slight rise in blood pressure and slowing of the heart beat, the effect on respiration is very slight indeed, as well as on the intestinal volume. Pilocarpine causes a slight fall in blood pressure followed by a rise, and the amplitude of the heart is slightly increased, there is distinct bronchial relaxation and the intestinal

#### DOG—VARIATION IN SPECIES

GRAPH VII



Tyramine

Pilocarpine

Adrenalin

As soon as the blood pressure rises to its maximum, the heart beat shows a marked slowing and an increase in the amplitude, bronchial relaxation is moderate, and there is a slight fall in spleen volume. Tyramine causes a marked fall in spleen volume, a moderate and prolonged rise of blood pressure with an increase in the amplitude and slowing of the heart beat, the relaxation of the bronchiole muscle is slight. Pilocarpine on the other hand causes the blood pressure to fall slightly, followed by a rise, the amplitude is increased and there is marked slowing of the heart beat, there is slight stimulation of respiration with slowing of the rate, the spleen volume shows a marked fall. Dogs in general give a poor adre-

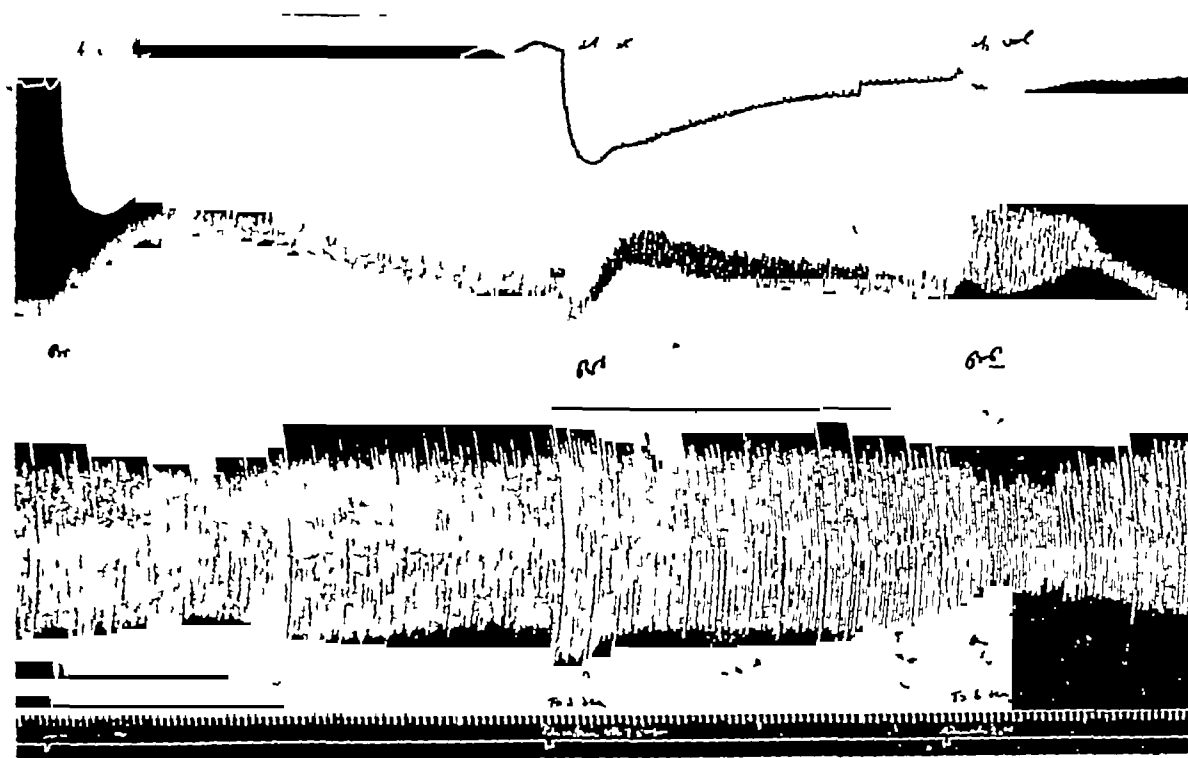
movements are very markedly increased. Here we have a species of animal with a moderately high adrenalin content in the blood, which gives us this reversed phenomenon of bronchial relaxation with pilocarpine. The rise in blood pressure after pilocarpine suggests that the thyroid secretions are slightly abnormal in amount.

(C) *Rabbit*—(Graph X) In these animals adrenalin causes a very marked rise of blood pressure, but no marked increase in the amplitude of the heart beat, there is marked bronchiole relaxation present, and the intestinal movements are almost stopped for the time being. Tyramine has no effect on respiratory movements, there is a very slight tendency for the blood pressure to rise,

and no effect on intestinal movements. Pilocarpine causes a fall of blood pressure which is not fol-

pilocarpine response suggests that there is a slight deficiency in the thyroid secretions

GRAPH VIII—DOG



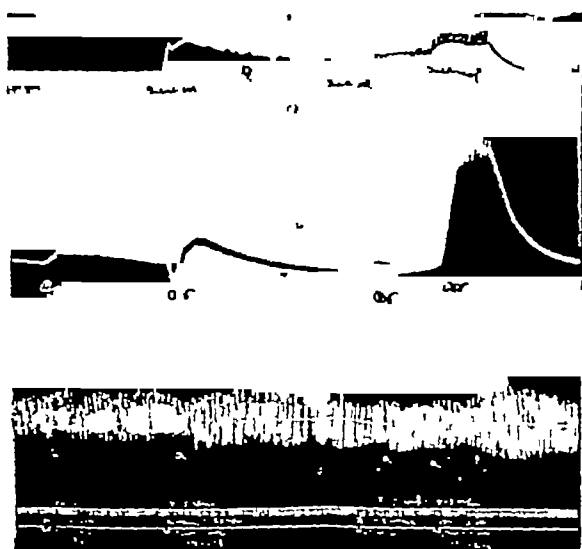
Tyramine

Pilocarpine

Adrenalin

lowed by a rise, but with an increase in the amplitude, there is no effect on the bronchiole muscles, but there is a marked increase in intestinal movements. Of these three species, the rabbit gives the most marked adrenalin reaction, which would inhibit the action of most of these bases. The

GRAPH IX—MONKEY



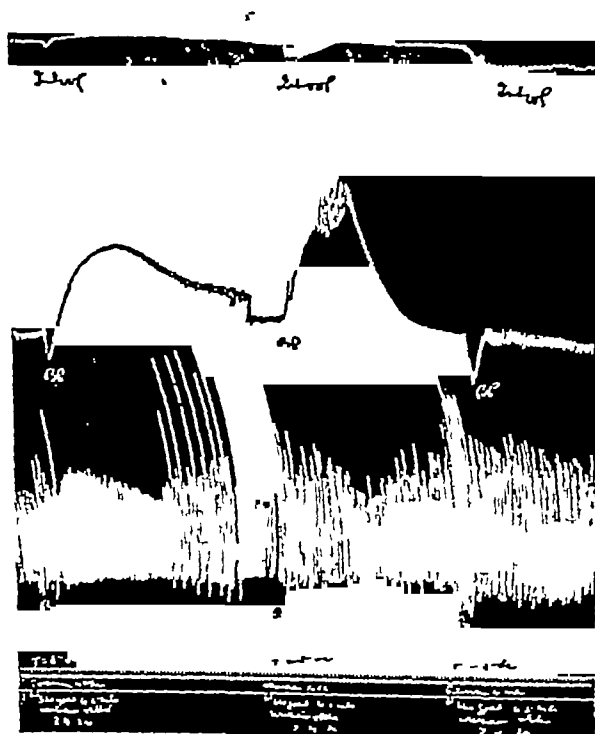
Tyramine

Pilocarpine

Tyramine

Adrenalin

GRAPH X—GOAT



Tyramine

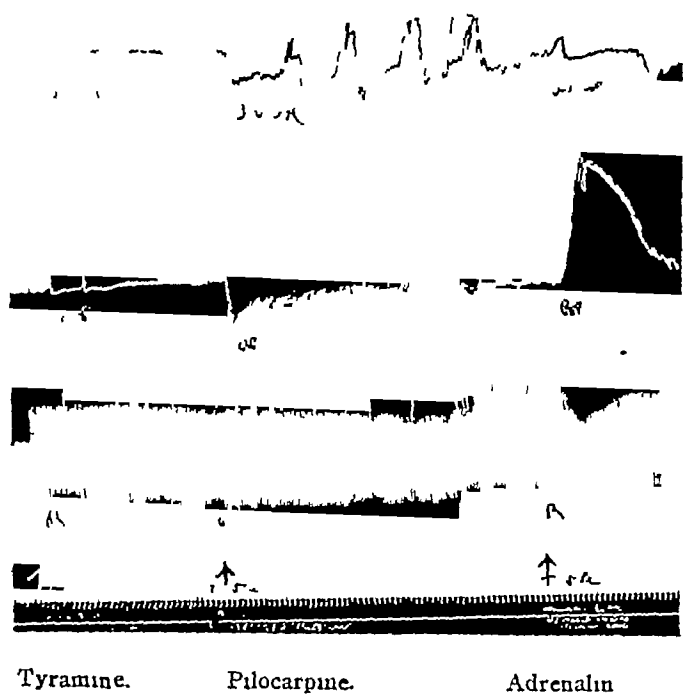
Adrenalin

Pilocarpine

(D) Goat—(Graph XI) In this animal, adrenalin causes a moderate rise of blood pressure, with an increase in the amplitude at the

pressure suggests that these animals are hyperthyroid

GRAPH XI—RABBIT



highest point, with irregularity of the heart beat, the respiration is relaxed momentarily, followed by bronchiole constriction, there is a slight fall of intestinal volume. Pilocarpine causes a slight fall of blood pressure followed by a slight rise, and the amplitude of the heart beat is increased, there is slight bronchiole constriction, and a fall of intestinal volume with increased movements. Tyramine caused a slight initial fall, but this was probably due to an air bubble getting into the circulation. There was a large and persistent rise of blood pressure, the respirations were stimulated, and there was no appreciable effect on intestinal movements. These animals possess a moderate amount of adrenalin as judged by the adrenalin response, whilst the behaviour of pilocarpine and tyramine on their respiration and blood

Summary

We see therefore that the phenomenon of susceptibility in these different individuals and species depends to a large extent on the varying amounts of the endocrine secretions that are present in the tissues. We realise that we are presenting a simplified picture of a series of complex chemical inter-actions, where one chemical is aided or hindered by another. If we have succeeded in changing your views from the non-committal views that are now taught in terms of idiosyncrasy, susceptibility or sensitiveness, to a more rational idea of a physical and chemical defence mechanism, we will have attained the object which we had in view when we set out to solve this difficult problem. The subject is immense in range and cannot be elucidated by wild theories. It requires careful experimental and clinical evidence, which will then give us a complete understanding of a whole host of diseases such as scurvy, asthma, beriberi, etc., which are at present but little understood by our profession. The practical outcome of this work is as follows—

(I) In Gotsch's test for hyperthyroidism. If 0.5 c.c. of 1 in 1,000 adrenalin is injected, a rise of 10 to 50 mm. in blood pressure occurs which persists for 1½ hours, but many persons who are not thyrotoxic are also susceptible. In animals with an excessive amount of thyroxin there is little or no alteration of the respiration in spite of the rise of blood pressure, whilst in animals with an excessive amount of adrenalin in the tissues, the blood pressure is raised but the respiration is markedly slowed and the bronchiole muscle relaxed, so that the breathing is shallow.

(II) Adrenalin has an immediate action in normal animals, raising the blood pressure and causing bronchiole relaxation, so that it is a most efficient stimulus to the heart and blood vessels when the amount of thyroxin and adrenalin in the tissues is high. In animals in whom there is an excess of adrenalin or deficiency of thyroxin, it is a powerful relaxor of the bronchiole muscles.

*This table summarises these results on normal cats and in those whose endocrine function has been altered experimentally*

Normal animals		Thyroid		Adrenals		Pituitrin
Drugs tested	Reactions	Animals fed on thyroid	Animals' thyroid removed	Adrenalin injected	Adrenals removed	Increased amplitude of all involuntary muscle
Adrenalin	B P ++ Resp --	B P +++ Resp +	B P + Resp ----	B P +++ Resp ----	B P + Resp +	
Tyramine	B P ++ Resp --	B P +++ Resp --	B P + long duration Resp ----	B P ± Resp nil	B P +++ Resp ----	
Pilocarpine	B P -- Resp --	B P - ++ Resp +	B P ---- Resp +++	B P nil Resp +	B P ---- Resp + --	

Blood pressure + = rise, — fall  
Respiration + = constriction, — relaxation



(III) The remote action of adrenalin is equally if not more important, as it diminishes capillary permeability, so that it is useful in the treatment of urticaria and giant urticaria and may therefore be useful in toxic œdemas, as, by diminishing permeability, it inhibits the action of these toxic bases on the myo-neural junctions

(IV) An excess of thyroid secretion in the tissues would cause an increase in the action of these bases when acting on the vascular mechanism, but would prevent their action when acting on the bronchiole muscle

(V) Commercial pituitrin increases the tone of the involuntary muscle and would therefore be useful in all flacid conditions of the involuntary muscles visceroptosis and intestinal stasis not due to mechanical obstruction

(VI) Drug idiosyncrasy—e.g., to quinine—can be explained as follows With hypochlorhydria and an increased alkalinity of the bowel more quinine would be absorbed and circulate in the blood The defective action of the liver would act in two ways,—the absence of bile would increase permeability and the quinine would not be so rapidly altered into quinenone A greater concentration of quinine circulating in the blood of a person with an excess of thyroxin would show its effects markedly on the circulatory system

(VII) The susceptibility of certain individuals to certain food diseases, e.g., beriberi, epidemic dropsy, etc., is due to similar causes as the above but in addition there is the antagonistic action of the vitamins, which decreases permeability, and prevents these poisons from acting on the tissues

(VIII) The sensitiveness of the endothelium of the vessels to these bases—such as is seen in urticaria, giant urticaria food asthma and in toxic œdemas—can be controlled by adrenalin injections, which diminish permeability and prevent these bases from acting

(IX) Asthma may be caused by stimulation of the vagus or of the sympathetic In the latter class of case both thyroid and adrenalin would be useful in the immediate and remote results by increasing this defence mechanism In vagotonia these endocrine secretions would be useless In either class of case it is necessary to find out and remove the underlying cause of the disease

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## THE EFFECT OF ENTERIC VACCINE ON ENDEMIC GOITRE IN CHILDREN

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MCCARRISON has claimed considerable success in treating endemic goitre with vaccines, especially in using those prepared from intestinal organisms (1)

While Medical Officer of the Royal Lawrence Military School, Sanawar, I was able to observe the effect of prophylactic enteric inoculation on the cases of endemic goitre then prevalent in the school

The Royal Lawrence Military School was founded by Sir Henry Lawrence in 1848, to serve as an asylum for the children of British soldiers serving in India from the fierce heat of the plains, and the still fiercer dangers that surround children in barrack life in India

The school is situated on Sanawar Hill, at an altitude of 5,500 feet, at a distance of 3 miles from the cantonment of Kasauli

It provides accommodation for 500 children, there being nearly equal numbers of both sexes, males slightly predominating

The ages run from 3 years to 20 years and in consequence of the fact that many of the children are orphans and of the conditions of school life peculiar to India, many of the wards, as they are designated, spend 6 to 10 years continuously in the school

The earliest records of the school note the incidence of goitre amongst the wards

By 1899 the condition had become so prevalent that, when in that year, the supplementing of the spring water supply with rain water became necessary, owing to the partial failure of the spring, arrangements were specially made for a dual supply

Rain water was reserved for drinking and cooking, spring water for washing purposes only

It was hoped that this dual system, which was perfected with a double pipe supply, would eliminate goitre from the school

To ascertain the progress being made to this end the Inspector-General of Civil Hospitals of the Punjab, under whose medical jurisdiction the school lay, ordered a quarterly return of the names of all wards suffering from enlargement of the thyroid gland, commencing from October 1st, 1899

The object of the dual water supply and of the return was soon lost, for in a few years the separation of the spring and rain water was discontinued owing to a break down of the dual pipe supply, and from motives of economy The return on the other hand continued to be rendered and probably still is

It affords a complete record of all cases of goitre occurring in the school since October 1st, 1899

In June, 1900, a large proportion of the wards were inoculated against enteric fever. A record of this was kept.

Again in October and November, 1913, the majority of the wards were inoculated against the enteric group.

In 1900, the typhoid vaccine was that prepared by the R A M C College.

In 1913, the T A B vaccine prepared by the Central Research Institute, Kasauli was used.

On each occasion two inoculations at intervals of seven to ten days were given in doses appropriate to the age of the child.

*Taking the inoculations carried out in 1900 —*

Of the wards present in the school at that time, i.e., on June 1st, 1900,—the records of 439 were available. Of these 189 had been inoculated and 250 had not been inoculated.

The number of those inoculated who became goitrous at any time after inoculation was 43 or 23.8 per cent.

The number of those not inoculated who became goitrous at any time after the date the inoculations were carried out was 63 or 25.2 per cent.

Of those inoculated the enlargement became manifest after

One year in	4 or 8.9 %
Two years in	0 or 0.0 %
Three years in	5 or 11.1 %
Four years in	5 or 11.1 %
Five years in	11 or 31.4 %
Six years in	17 or 37.7 %
Seven years in	1 or 2.2 %
Eight years in	2 or 4.4 %
Nine years in	0 or 0.0 %

Of those not inoculated the enlargement became manifest after

One year in	6 or 9.5 %
Two years in	0 or 0.0 %
Three years in	6 or 9.5 %
Four years in	1 or 1.3 %
Five years in	19 or 30.1 %
Six years in	24 or 36.0 %
Seven years in	1 or 1.3 %
Eight years in	5 or 7.9 %
Nine years in	1 or 1.3 %

I do not think, therefore, there is any evidence that the 1900 inoculation had any prophylactic effect, near or remote, on the incidence of goitre in the school.

The number of cases returned as being goitrous before the date of the inoculation was 90.

Of these, 39 were subsequently inoculated and 51 were not inoculated.

Of the 39 inoculated the numbers ceasing to be returned as goitrous were

Between June 1900 and June 1901	20 or 51.3 %
Do " 1901 and " 1902	3 or 7.4 %
Do " 1902 and " 1903	2 or 5.1 %
Do " 1903 and " 1904	1 or 2.7 %
Do " 1904 and " 1905	3 or 7.4 %
Do " 1905 and " 1906	7 or 18.0 %
Do " 1906 and " 1907	2 or 5.1 %
Do " 1907 and " 1908	1 or 2.7 %

Of the 51 non-inoculated the numbers ceasing to be returned as goitrous were

Between June 1900 and June 1901	26 or 54.9 %
Do " 1901 and " 1902	3 or 5.9 %
Do " 1902 and " 1903	7 or 13.7 %
Do " 1903 and " 1904	3 or 5.9 %
Do " 1904 and " 1905	0 or 0.0 %
Do " 1905 and " 1906	5 or 9.5 %
Do " 1906 and " 1907	3 or 5.9 %
Do " 1907 and " 1908	1 or 1.9 %
Do " 1908 and " 1909	0 or 0.0 %
Do " 1909 and " 1910	1 or 1.9 %

I do not think, therefore, there is any evidence that the 1900 inoculation had any curative effect on the goitre prevalence in the school.

*As regards the effect of the inoculations carried out in 1913 —*

At this time the boys' department, or a little over half the school, was the subject of an experiment conducted by McCarrison (2) to ascertain the result of a bacteriologically clean water supply on the incidence of goitre.

It was, therefore, not possible to compare cases in the same way as in 1900.

The method employed therefore was to take a number of direct measurements of goitres from amongst the goitrous guls, and compare the results in those inoculated, and those not inoculated.

The girls were measured the day before the first dose of the inoculations was given, and at intervals of two or three days subsequently for a period of six weeks.

Towards the end of this period, attendances for various causes,—not the least being the absence of any startling curative effect,—tailed off considerably. Measurements were taken always at the same time, i.e., 10 a.m., and under as equal conditions as possible.

A metal centimetre tape was used over the largest circumference, which was marked with dots by silver nitrate to ensure the same circumference being measured on each occasion.

Table (A) tabulates the results.

It will be seen from the table that although many decreases in neck measurements occurred after inoculation, an almost equal number of decreases can be noted in those not inoculated.

Taken individually, the inoculations of 1913 with T A B vaccine had no curative effect on the goitre prevalent.

Endemic goitre, especially in its milder forms and in the young and especially in the male, is a condition which is liable to spontaneous exacerbations and remissions.

This has been pointed out by McCarrison from figures supplied by myself (2).

As a further example I would quote the cases of 271 wards who entered the school after October 1904, and left before January 1st, 1913. These, therefore, are beyond the

TABLE A

Case.	Measurement before 1st inoculation	1st inoculation	Measurement one week from 1st inoculation	Increase or Decrease from preceding measurement	2nd inoculation.	Measurement 2nd week from 1st inoculation	Increase or Decrease from preceding week	Measurement 3rd week from 1st inoculation	Increase or Decrease from preceding week	Measurement 4th week from 1st inoculation	Increase or Decrease from preceding week	Measurement 5th week from 1st inoculation	Increase or Decrease from preceding week	Measurement 6th week from 1st inoculation	Increase or Decrease from preceding week	Increase or Decrease of last measurement over the 1st.
GB	33.50	*	33.50	-2.50	*	34.00	+0.50	34.00	-1.00	33.75	-0.25	35.00	-0.25	35.50	+0.25	+0.25
LB	37.00	*	34.50		*	34.00	+0.50	34.00	-1.00	34.00	-0.50	32.00	-0.50	33.00	+0.50	-3.00
LC	35.00	*	35.00		*	35.75	+1.00	35.75	+0.25	35.25	-0.25	34.75	-0.25	33.00		+0.25
EE	32.00	*	32.00		*	32.00	-0.25	32.00	+0.50	30.75	+0.75	32.00	+0.75	32.00		-1.25
IF	34.00	*	34.00		*	34.00		34.00		34.75		32.00		31.00		+1.50
VG	32.00	*	32.00		*	32.00		32.50		32.00		32.00		32.00		
ES	32.00	*	32.00		*	32.00		32.00		32.00		32.00		32.00		
DT	33.00	*	32.00	-1.00	*	31.75	-0.25	32.00	+1.50	32.50	-0.75	31.00	-0.75	31.00	-1.50	-2.00
MC	32.00	*	31.50	-0.50	*	32.50	-0.50	32.50	+1.50	32.75	+0.25	33.00	+0.25	33.00	+0.25	+1.00
EK	33.00	*	32.00	-1.00	*	32.00	-1.00	32.00	+1.00	31.00	-1.00	30.75	-0.25	30.75	-0.25	-2.25
DM	29.00	*	28.50	-0.50	*	28.50	-1.00	28.00	-1.00	27.50	-1.00	27.50	-1.00	27.50	-1.00	-1.50
LQ	32.00	*	31.00	-1.00	*	30.00	-1.00	31.00	+1.00	30.00	-1.00	30.00	-1.00	30.00	-1.00	-2.00
IW	28.00	*	28.00		*	28.00		28.00		28.00		27.00		27.00		-1.00
CO	31.50	*	31.50		*	32.50	+1.00	31.00	-1.50	30.75	-0.25	31.00	+0.25	31.00	+0.25	-0.50
ML	30.50	*	30.00	-0.50	*	30.50	+1.00	30.50	+0.50	31.00	+0.50	29.00	+0.50	29.00	-3.00	-1.50
LC	36.00		35.50	-0.60		36.50	+1.00	35.50	-1.00	34.50	-1.00					-1.50
IE	36.00		35.00	-1.00		34.00	-1.00	34.00	+1.00	35.00	+1.00					-1.00
EP	30.00		30.00			29.00	-2.00	29.00	+1.00	30.00	+1.00					-3.00
LM	35.00		34.00	-1.00		32.00	-1.00	32.00	-1.00							-1.50
MJ	32.00		26.00	-0.50		25.00	-1.00									
C	26.50															
	32.40	*	31.80	-0.60	*	32.40	+0.50	32.40	+0.50	31.80	-0.50	30.75	-1.05			-1.65
	34.20		32.00	-2.20		32.70	-0.80	32.70	+1.50							-50

influence of any inoculation or water-purifying operations, but they all became goitrous

Of these, the number in which the goitre persisted from its first appearance until the ward left the school was 131 or 48 per cent

While the number in which after its first appearance the goitre disappeared while the ward was still in the school was 140 or 52 per cent

Out of these 271 cases of goitre the course of the condition was continuous in 170 or 62 per cent and in 101 or 38 per cent the course was interrupted, i.e., there were remissions and subsequent relapses

That is to say, half the cases of goitre, occurring at the school, disappeared spontaneously, while still at the school, and nearly half the cases showed remissions of the condition during its course

Table (B) shows the detailed history of 17 of the above cases as revealed by the quarterly return

The course was continuous in 65 or 51 per cent, and interrupted in 61 or 49 per cent

This tends to show that goitre in males is more liable to spontaneous cure, but less liable to fluctuations and remissions, than in females

Conclusions

1 Neither T A B nor enteric vaccine had any effect, curative or prophylactic, remote or near, on the endemic goitre prevalent at the school

2 Endemic goitre is a condition peculiarly liable to spontaneous disappearance and re-appearance, in its endemic form amongst children

3 These fluctuations of the thyroid should be taken into consideration in judging the effect of any particular line of treatment

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(2) An Enquiry into the Causation of Goitre at the Lawrence Military Asylum, Sanawar McCarrison  
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TABLE B

Year	1905				1906				1907				1908				1909				1910				1911				1912			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
H T			G	G	G	G	G	G	G			G			G																	
R S							G	G	G			G		G																		
N D			G	G																												
C F							G	G	G	G		G	G		G																	
H J							G	G	G	G		G	G		G																	
H W							G	G		G		G	G		G																	
A A			G	G	G	G	G	G	G	G		G	G	G	G	G	G															
Q M												G	G	G		G																
W K			G	G	G	G						G																				
B B							G	G	G	G			G				G	G	G	G	G		G		G							
L H			G				G																									
B G																																
S O												G																				
B I							G																									
B E			G	G	G	G	G	G	G	G		G	G	G	G	G	G															
C C							G																									
K L							G																									

N B

GGG G

indicates present at the School  
indicates the quarters in which returned as being goitrous

It is interesting to note that in this series of 271 cases—of whom 145 were boys and 126 girls—in the boys, goitre persisted from its first appearance until the ward left the school in 61 cases or 42 per cent. Goitre disappeared before the ward left the school in 84 or 68 per cent. The course of the goitre was continuous in 105 or 72 per cent and was interrupted in 40 or 38 per cent

Among the girls, goitre persisted from its first appearance until the ward left the school in 70 or 55 per cent. It disappeared before the ward left the school in 56 or 44 per cent

ON TRANSIENT INFECTIONS WITH LEISHMANIA DONOVANI IN MAN AND ANIMALS

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IN a previous memoir, Knowles, Napier and Das Gupta (1923) have shewn that when the parasite of kala-azar,—as present in the blood,

spleen or liver juice of man in its leishmania phase is injected into an experimental (vertebrate) animal one of four results may follow—

(a) The infection may never take at all the animal remaining well and fit, and films and cultures from its liver juice shewing no parasites. This is the most usual result in the laboratory. In Table VII (A) of the memoir already quoted out of 23 monkeys, 11 dogs, 20 white rats and 14 white mice so injected, 19 monkeys, 9 dogs, all 20 white rats and 13 white mice failed to shew infection, or in all 61 failures out of 68 animals inoculated,—a failure rate of 89·7 per cent.

(b) If the injection be given intradermally occasionally a localised skin lesion may result,—the lesion shewing very marked differences from those produced by *L. tropica*, e.g., the “dermal leishmanoid” monkey whose history is given on pp 325, 326, Plate A and Table III (C) of the same memoir. It should be noted further that the infection apparently failed to visceralise in this animal. Row (1914) also succeeded in producing a localised skin lesion in a monkey, but in this instance by the intradermal injection of cultures of *L. donovani* shewing “post- and super-post flagellate” forms.

(c) Occasionally the injected animal may appear to remain in good health, but on repeated liver puncture and on examination of films and cultures from liver juice, it is found that the animal has acquired a transient and symptomless—or almost symptomless—visceral infection with *L. donovani*. Five animals out of the 68 referred to in Table VII (A) of the same memoir shewed this sequence of events, viz—

*Monkey No 1*—Blood cultures negative on the 48th day after injection. Splenic enlargement with spleen puncture films or cultures *positive* on the 81st and 150th days after injection. Spleen and liver puncture films and cultures negative on the 199th day. Blood culture negative 14 months after injection. Animal then in excellent health.

*Monkey No 2*—Spleen and liver puncture films and cultures negative on the 60th and 74th days after injection. Spleen and liver puncture films and cultures *positive* on the 95th and 223rd days after injection. Liver puncture films and cultures negative on the 284th day, animal in good health.

*Monkey No 16*—Liver puncture cultures *positive* on the 50th day. Animal chloroformed when dying from beriberi on the 98th day, films and cultures from the viscera all negative.

*Monkey No 21*—Cultures from liver puncture fluid *positive* on the 31st, 50th and 88th days after injection,—films being negative. Animal never shewed splenic enlargement. Was in excellent health 7 months after injection. Liver puncture carried out in the 8th month—(after publication of the previous paper)—gave negative results in films and cultures.

*Pup No 10*—Liver puncture films negative, cultures *positive* on the 51st day after injection. Liver puncture films and cultures negative on the 99th day after injection. Animal in good health 6 months after injection.

The blood sera of monkey No 16 and of pup No 10 gave a negative aldehyde reaction at the time when cultures from their liver juice gave a growth of *L. donovani*.

In the words of the original memoir, “what we get—usually—, when a positive result occurs,

is not kala-azar, but a transient, symptomless, leishmania infection, the existence of which can only be demonstrated by culture of liver puncture fluid on N N N medium, or by the chance finding of very scanty parasites in smears from the organs.” The incidence of this condition was in 5 out of 68 animals inoculated,—or 7·4 per cent.

(d) Lastly, the animal may develop acute kala-azar, the disease in the experimental animal conforming in every respect with that in man, and ending fatally, whilst films from the spleen, liver and other viscera both during life and after death shew innumerable *L. donovani*, and cultures from such material are richly positive. One such animal—(Pup No 2)—is recorded in Table VII (A) of the memoir, whilst another animal, Monkey No 24, of Table VII (B)—acquired acute and fulminating kala-azar apparently by the oral route. Shortt (1923, p 1157) records that of 13 monkeys—*M. rhesus*—inoculated with spleen or liver emulsion, 10 gave positive findings of *L. donovani* subsequently, but in only two of these did acute and fatal kala-azar develop. Even accepting his figure of 2 out of 13, the incidence of the acute disease in experimental animals is only 15·4 per cent, whilst in the Calcutta series of experiments it has been much less,—2 out of the 82 animals in Tables VII (A) and VII (B) taken together, or only 2·4 per cent.

Does a similar state of affairs prevail with regard to *L. donovani* infection in man in the endemic and epidemic kala-azar areas? There is evidence that it does, and it is with a view to analysing such evidence that the present paper has been written.

(a) Even in its most acutely epidemic form, kala-azar is a disease which affects only a minority of the persons living in an infected area. The worst Indian epidemic of which we have any accurate record was that in the Nowgong District of Assam in the decade 1891-1901. During this decade, according to Sir Leonard Rogers (1910, p 42), there was a decrease of the total population of the district of 24 per cent, or if only the indigenous Assamese be considered, of 31·5 per cent. This decrease,—appalling though it is,—includes deaths from diseases other than kala-azar and loss of population from emigration.

It is probably true that many persons living in an endemic kala-azar area are not merely exposed to infection, but are actually inoculated with the parasite of kala-azar, and yet do not acquire the disease. Such a view would be in keeping with what we know of other human protozoal diseases, for instance Dobell and O'Connor state that in only some 10 per cent of *E. histolytica* carriers do symptoms of amoebiasis occur, whilst Christophers has shewn that a single heavily infected anopheline mosquito is likely to do far more damage in malaria transmission than are many slightly infected ones. In addition to factors affecting the dose of infective virus injected (or ingested) in the case of kala-azar, the experience with our experimental animals,—the great majority

of which failed to take the infection even after such massive injections as 10 c.c. of spleen emulsion intraperitoneally plus intravenously—suggests that other factors in the vertebrate host may determine whether the infection does or does not take.

Hitherto man has been regarded as being relatively susceptible to infection with kala-azar, and animals as being relatively insusceptible. This view, however, is possibly not correct. If 90 per cent of experimental animals inoculated with big doses under laboratory conditions entirely escape infection, possibly a similar proportion of a population not merely exposed to risk but actually inoculated with the parasite, might escape the disease. The slow mode of spread of kala-azar may not necessarily mean that only a minority of individuals in the area are exposed to risk, if man be as insusceptible to infection as are laboratory animals, possibly the majority of persons living in an infected area are freely exposed to risk, but in only a small proportion of them do the parasites multiply sufficiently to produce symptoms. Instead of the distribution of the parasite in the outside environment being a very limited one, and man but little exposed to risk, the distribution of the parasite in the outside environment may possibly be widespread, but man be relatively insusceptible to infection.

(b) That *L. donovani* may cause dermal lesions is shewn by Dr Brahmachari's and Dr Bhattacharji's cases of "dermal leishmanoid" referred to in the memoir already quoted. In both these patients the visceral disease had been cured long before the skin lesions became apparent, in one instance culture of the peripheral blood and in the other of spleen juice gave negative results. Yet such cases constitute a rarity in man, just as do cases of intradermal localised infection in experimental animals.

(c) There is an increasing volume of evidence that transient visceral leishmaniasis may occur in man. It is not always symptomless.

In the first place the mortality in untreated cases of kala-azar is not always cent per cent. Sir Leonard Rogers (1910), writing several years before he introduced the tartar emetic treatment into this country, records that Dr Dodds Price had a 96 per cent case mortality among several hundred cases in the Nowgong epidemic. Among 500 later cases systematically treated with quinine, the case mortality was only 75 per cent. Rogers' own figures for 65 cases treated at the Presidency General Hospital, Calcutta, gave 21 per cent as having been alive and in good health some months to upwards of a year after the cessation of treatment. As the "treatment" in vogue in those days was with large doses of quinine, supplemented in some cases by staphylococcus and other vaccine injections, and as our further experience of the disease has shewn that such treatment has but little influence on the disease, we are on safe ground in claiming that the mortality rate in untreated cases of kala-azar does not ordinarily ex-

ceed 80 per cent, it may indeed be a considerably lower figure.

There are already recorded in the literature cases where proved infection with *L. donovani* has been transient, and sometimes symptomless. Patton (1914, p. 503) records the case of an Anglo-Indian female aged 24, said to have had fever for only ten days, a year prior to examination, and with no enlargement of the spleen or liver, in whose peripheral blood parasites were found in the fourth film searched. Knowles (1920, p. 142) records the case of the mother of a child which died from kala-azar, the husband being also infected, who had no suspicion that she was infected. Upon examining her, the spleen was found to be appreciably enlarged and spleen puncture showed *L. donovani*. Mackie (1922, p. 330) says that he saw a patient in 1913 in the pre-antimony days who had been free from fever and other signs of the disease for several years and who was working as a bungalow servant. The spleen was found, however, to be enlarged and hard, and spleen puncture shewed the presence of *L. donovani*. This case Mackie regards as being an instance of a "genuine carrier" of the disease.

To these cases the writers now desire to add details of two others which have recently come under their notice.

Case 1.—An Indian Christian girl, aged 11, was admitted to the Carmichael Hospital for Tropical Diseases from a mission orphanage in Elliott Road, Calcutta, on the 6th August, 1922. There was a history of prolonged and irregular fever, but the spleen and liver were not enlarged. The temperature was 102°F on admission and thereafter slowly declined. It reached normal on the 6th day after admission, and thereafter remained normal.

Blood examination.—Aldehyde reaction negative. Widal reaction negative. No parasites seen in blood films. Hæmoglobin 65 per cent. Total red corpuscles 4,862,500 per cmm. Total leucocytes 3,744 per cmm. Differential count on 250 leucocytes—eosinophiles 0.4 per cent, polymorphonuclears 35.6 per cent, small mononuclears and lymphocytes 40.8 per cent, large hyalines and transitionals 23.2 per cent.

Quinidine, gr. iv tds was administered from the 5th day in hospital. The temperature immediately dropped to normal, and, as the patient was anxious to go home, she was discharged on the 8th day after admission and instructed to continue a month's quinidine treatment.

In the meantime a routine culture of the peripheral blood had been taken on the 3rd day after admission. After the patient's discharge from hospital, this culture, examined 8 days after taking it, shewed *L. donovani* in fair numbers.

The orphanage authorities were now informed. As there was no bed vacant, the child could not be readmitted. The orphanage authorities, however, stated that the child was doing very well indeed. She was brought up for examination six months later. There had been no fever during this interval, there was no enlargement of either the liver or spleen, and a culture of the peripheral blood remained sterile and free from parasites. Seen again still a year later she was in excellent health, with no symptoms or signs of disease. No anti-kala-azar treatment was given.

This case appears to be clearly one of transient leishmania infection with spontaneous cure.

Case 2.—R. C., Hindu male, medical practitioner, resident in Calcutta. Attacked on the 23rd December,

1923, with high fever and rigor. The temperature then dropped to normal with profuse sweating. The second day it rose again but there was no rigor. From the third day onwards there was high continued fever with repeated rigors (three in 24 hours on the third day), severe retching and bilious vomiting.

At this stage the case appeared to be one of malignant tertian malaria. Examination of blood films on the 25th and 27th December failed to shew malarial or other parasites.

Rigors ceased on the 5th January, 1924—(14th day of illness)—but the temperature remained high and continuous. On the 7th January the patient became unconscious and collapsed. He was brought round with some difficulty and thereafter the course of the illness resembled that of an infection with enteric fever. The fever continued for 43 days in all and gradually dropped to normal by lysis, the bowels were constipated throughout, the spleen was just palpable, and the liver not enlarged. In clinical terms,—and unassisted by laboratory diagnosis,—the case would probably have been recorded as one of "typho-malaria."

On the 15th day of illness, the blood picture was as follows—Hæmoglobin 60 per cent. Total red corpuscles 4,000,000 per c.mm. Total leucocytes 6,000 per c.mm. Differential leucocyte count—eosinophiles 3 per cent., polymorphonuclears 60 per cent., small mononuclears and lymphocytes 28 per cent., large hyalines and transitionals 9 per cent. The Widal reaction (carried out in Major Acton's laboratory) shewed a positive agglutination to *B typhosus* at a dilution of 1 in 100.

Brahmachari's globulin test,—(performed by some outside laboratory)—was negative. A peripheral blood culture, however, taken on the 15th day of illness, shewed a growth of *L. donovani* flagellates ten days later.

It was therefore clear that the patient had kala-azar,—whether with or without malaria and typhoid fever as complications must remain uncertain. He made a slow recovery. At the end of March 1924 the spleen was not sufficiently enlarged for puncture. A peripheral blood culture was taken. It was examined on the 10th day and no leishmania could be detected. Subsequently it unfortunately became septic. A third culture of the peripheral blood, taken about the beginning of April, also unfortunately became septic. A fourth culture of the peripheral blood, taken on the 4th May 1924 remained sterile and negative on the 20th May 1924.

The patient's illness may be said to have terminated about the 6th of March. At the time of writing, at the end of May, the patient is in fair health but debilitated after his prolonged illness. The spleen and liver are not palpable. There is some anæmia, but no fever at all. He is able to carry out his duties. When last seen he was advised to "carry on," and to return for examination if there was any recurrence of fever. No anti-kala-azar treatment has been given.

In this instance we have a patient with a clinical history suggesting a combination of malaria and typhoid fever, a proved diagnosis of *L. donovani* infection, and apparently spontaneous recovery.

It would therefore appear that transient,—but not necessarily symptomless,—infection with *L. donovani* may occur in man.

(d) That acute kala-azar may follow exposure to infection is a commonplace. The mortality in treated cases is to-day,—despite the successful antimony treatment,—some 10 per cent or more.

The writers have no desire to dogmatise, and the evidence at present available is insufficient upon which to found any conclusions. But if infection with *L. donovani* in man be at all like infection with *L. donovani* in experimental animals in the laboratory, then our ideas as to the epidemiology of kala-azar may need some revision.

It would be of interest if kala-azar in man were but the end-phase, as it were, of a more widespread and usually symptomless herpetomoniasis of man, i.e., a harmless infestation with *L. donovani*. Such a hypothesis might explain the apparently wide variation in incubation periods of the disease in man, an intensive infection in an already debilitated subject being followed by the onset of kala-azar within a period measurable in days, on the other hand a prolonged and more or less symptomless infestation of months or even years' duration only developing into the disease known as kala-azar on the onset of some severe intercurrent infection such as an attack of malaria, of enteric fever, or of bacillary or amoebic dysentery.

Such a suggestion is, however, intended as a suggestion merely, and the writers do not intend to emphasise it in any way. Yet there may be some widespread, and as yet not understood factors underlying the curiously different modes of onset and the slow spread of the disease.

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### SOME EXPERIMENTS ON THE INJURIES PRODUCED BY FIREARMS AT SHORT RANGE

By CLIVE NEWCOMB,

MAJOR, I M S,

*Chemical Examiner, Madras*

IN medico-legal shooting cases a question that turns up from time to time is—What can be inferred from the appearance of the injury as to the weapon used and the range? If the weapon used is known, or if the bullet or shot can be found and the sort of weapon used can be deduced from them, the advice commonly given in text-books, that the investigator should make experiments for himself with the actual weapon or one similar to it is very sound. In many cases, however, neither the weapon nor the bullet can be found, or for other reasons this advice is impracticable, and all that there is to go on is the injury. On this point the data given in text-books are often lacking in precision, especially as to the effects of modern weapons.

Some experiments, therefore, were made to see what answer could be given to the question, when nothing was known as to the



nature of the weapon used As in the majority of shooting cases the shot goes through the clothes, pieces of cotton cloth hung over sandbags were chosen for the target, and were shot at, using various weapons, at ranges from nothing up to ten feet The range was measured from the muzzle of the gun to the target, and the experiments were made in the middle of the day in the Arsenal, Fort St George, with a shade temperature of about 105°F

The weapons used were —

(1) A 303 service rifle firing service ammunition, (cordite)

(2) A 375 Mannlicher-Schorner, high-velocity, sporting rifle, firing axite and an expanding nickel-cased lead bullet

(3) A 400-450 high-velocity sporting rifle, firing 60 grains of axite and a 400 grain nickel cased lead bullet

(4) A 450 service revolver firing service ammunition, (cordite)

(5) A 476 Martini-Henry smooth bore gun, firing black powder and a spherical lead bullet

(6) A 12 bore shot gun firing smokeless powder (K S G) and No 5½ shot

From amongst these weapons, the black powder gun could easily be distinguished from all the others by the grains of unburnt black powder which were left, generally firmly embedded in the cloth, all round the injury These grains of powder were very apparent at all ranges up to 10 feet—the longest range tried Their presence is a certain sign that the injury was caused by a black powder weapon, and their absence makes it probable that either a smokeless powder weapon was used or that the range was well over 10 feet

The shot gun could be distinguished from the others by the large ragged hole the shot made, and in any case it is very unlikely that where this type of weapon is used none of the shot should be found

The revolver could be distinguished from all the others at ranges below 5 feet, by the presence of grains of unburnt cordite all round the bullet hole In none of the long-barrelled weapons firing smokeless powder were any grains of unburnt explosive to be seen

For each of the above weapons there was a definite range below which the cloth round the shot hole was blackened, as is shown in the following table —

Weapon	Blackening begins to show at	Blackening very definite at	Scattered grains of unburnt explosive up to	—
(1)	6 inches	2 inches		
(2) }	No blackening			v note (1)
(3) }	1 foot	6 inches	5 feet	
(4) }	4 feet	3 feet	over 10 ft	v note (2)
(5) }	3 feet	2 feet		
(6)				

# Notes

(1) The cloth was set on fire at ranges below one foot

(2) Although in these cases there was no blackening, at ranges below six inches the nap of the cloth was blown off by the blast of gases

The presence or absence of blackening shows the ranges to be less than or greater than four feet with any of the above weapons, while from the other considerations noted a closer estimate of the range can often be given

Two other experiments were made to try to test the theory that a revolver pressed tightly against the skin of the body, may go off and no serious injury be produced Cases of attempted suicide have been recorded in which this is said to have occurred (Glaister *Med Jurisp* 1902, p 202)

In the absence of any volunteers for a more accurate reproduction of such a case, the skin in our experiments was represented by a piece of stiff leather stretched over a sandbag An old service revolver, with an eight-inch barrel, was fixed between sandbags with its muzzle pressed hard against the leather, and a service cordite cartridge fired from it Each time, although the revolver was sufficiently firmly fixed for it not to have been shifted by the recoil, the bullet pierced the leather and was lost in the depths of the sandbag We think, therefore, that such an accident could not happen with a service revolver firing cordite ammunition, or indeed with any but the very worst ammunition

The author quite realises the desirability of more extensive experiments on all the points raised in this paper, which is offered for publication in the hope that others may be induced to record more experiments with different weapons

The thanks of the author are due to Lieutenant E F Harvey, Att I A O C for his most valuable assistance in all these experiments, and for the loan of some of the weapons used

## INTESTINAL COLEOPTERA

By T BAINBRIGGE FLETCHER,

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*Imperial Entomologist, Agricultural Research Institute, Pusa*

THE occurrence of a pathological condition associated with the presence of living beetles in the human intestine has attracted the attention of several observers of late years, both in Bengal and in the low-country of Ceylon Cases occur principally in children of both sexes between the ages of three and five years, with symptoms pointing to an obscure form of diarrhoea, sometimes associated with griping and emaciation The living



ing beetles may be passed out naturally with the stools, but in several cases they have been passed out under medical observation following a rectal injection. There is thus no doubt about the actual occurrence of the beetles in the intestines. It is not a case of mistaken observation of beetles attracted to the stools after evacuation.

These beetles, so far as they have been observed hitherto, are all small species of the true dung-beetles belonging to the sub-family Coprinæ of the family Scarabæidæ. Those definitely noted are *Onthophagus bifasciatus*, another undetermined species of *Onthophagus*, and *Caccobius mutans*. All of these beetles, with the other species of the large group of Coprinæ, feed normally on dead animal matter and especially on animal excrement. Patches of cattle dung or human ordure, if examined, will usually prove to have some of these dung-beetles in them, the beetles being attracted to the excrement, as soon as it is dropped, by their sense of smell, burrowing in and under it, feeding on it and carrying it away in order to bury it in the soil, where they may either feast on it at leisure or deposit their eggs in it. An excellent account of the habits of these beetles attracted to human ordure, will be found in Major R. W. G. Hingston's book, "A Naturalist in Hindustan."

The beetles implicated in cases of human infection being of common occurrence in human excrement, after it has been evacuated, it still remains to be shown how the beetles can obtain access into the human intestines. This is still a moot point, which was discussed at some length in connection with two papers read at the Fourth and Fifth Entomological Meetings, held at Pusa in 1921 and 1923, respectively. So far, we are without any exact information on this point, and any opinion given can be at the best only a guess at the truth.

To me, however, the following facts seem to be significant, so far as exact details are available —

(1) Only the adult beetles have been passed out in all recorded cases.

(2) In seven cases in which the sex of the beetles was recorded, six were females and only one a male.

(3) Except in one case (when an adult at Hoolarhat was concerned), all the cases reported have occurred in children of ages about three to five.

(4) All cases have been reported from hot moist areas in Lower Bengal and the low-country of Ceylon.

Bearing these facts in mind, it seems to be most probable that the adult beetles, guided by their keen sense of smell in the search for human ordure, themselves effect an entrance through the anus, when this part of the body is exposed, unprotected by clothing during

sleep in warm weather and is probably soiled to some extent, especially in the case of young children who have not yet learnt cleanly habits.

As this condition seems to be not uncommon in Lower Bengal, it is to be hoped that medical practitioners, who may come across cases, will record details and, in particular, will secure specimens of the beetles concerned, so as to afford further information on this subject. Specimens may be dropped into a small phial or tube of rectified spirit, *inside* which should be placed a label with brief particulars written *in pencil*. Such specimens may be sent either to the Calcutta School of Tropical Medicine or to the Imperial Entomologist, Pusa, for examination and identification.

## IS LEPROSY CURABLE ?

By DR E. MUIR,

*Research Worker under the Indian Research Fund Association, School of Tropical Medicine and Hygiene, Calcutta*

THIS question has been discussed so much of late that a few incontrovertible facts may be of interest. These are in the form of the tabulated results of the leprosy out-dispensary held in connection with the Calcutta School of Tropical Medicine.

While some 600 cases have attended the dispensary during the last 3½ years, many of these have come for advice and continued treatment under private practitioners. Others obtained a certain amount of benefit and, considering themselves cured or not being able to attend for a longer period, discontinued treatment before they had reached a stage at which we could pronounce them free from all active signs of the disease and therefore apparently cured.

Discarding all such cases, we have tabulated those in which the patients have persisted with treatment up to date or till they were considered as free from all active signs.

The tabulated cases are 203 in number, and of these 43 have lost all signs of disease. Some of these are still under treatment, others come at monthly, 3 monthly, or 6 monthly intervals for inspection. They have been free from the disease for periods varying from 3 months to 3 years.

The method of classification is important. "A" represents nerve cases which have been diagnosed from the presence of anæsthesia and other nerve symptoms, but in which the bacteriological examination was negative for lepra bacilli. "B" represents those cases in which the bacteriological examination was positive. A<sub>1</sub> represents primary nerve cases and A<sub>2</sub> secondary nerve cases. B<sub>1</sub> includes early bacteriologically positive cases, B<sub>2</sub> those of a more advanced degree and B<sub>3</sub> cases with great lepromatous thickening of the skin and very large numbers of lepra bacilli.

As was pointed out by Hansen long ago (Leprosy, Hansen and Looft, Walker's Translation, p 67)

and was lately elaborated by me (*Lancet* Feb 9th, 1923), leprosy is a self-healing disease. When the disease has burned itself out after many years of suffering, the end lesions are generally trophic ones due to fibrous contraction in the nerve trunks causing destruction of nerve fibres. It is such cases that crowd the leper asylums and settlements when they are no longer able to make a livelihood due to their deformed fingers and toes, but careful search will generally fail to detect any lepra bacilli. These are the secondary nerve cases designated  $A_2$ , and all the other classes if they survive long enough tend to pass into this class. To anyone who has studied the pathology of such cases it will be evident that treatment can only alleviate the sufferings of such cases. It cannot restore the lost fingers and toes or the destroyed nerve fibres. In such cases sensation can only be recovered to a limited extent and yet I have found such cases being treated in leper asylums and leprosy treatment being unfavourably reported on since they did not recover complete sensation. Many of such cases are no more suffering from leprosy than are pock-marked people suffering from small-pox. The disease has died out and has only left its scars.

Just as most cases end in  $A_2$ , so most cases begin with  $A_1$ . That is to say the disease may first be diagnosed by an anæsthetic patch which gives bacteriologically negative results on examination.

This is of extreme importance as will be seen from the table, for, though 36  $A_1$  cases are shown with active signs still remaining and 32 free from all active signs, yet, if cases which have been treated for less than a year are excluded, the proportion is 16 without active signs to 7 with them, and this favourable proportion increases steadily

as treatment progresses. The same holds good to a more limited extent with  $B_1$  cases.

Now if (as I hold to be undoubtedly the case) almost all cases have to pass through  $A_1$  and  $B_1$  before they reach  $A_2$  and  $B_2$ ,  $B_3$ , and if, as the table shows,  $A_1$  and  $B_1$  cases can be almost invariably freed from all active signs of the disease, we have in our hands a method of dealing with the disease which only needs to be efficiently applied to stamp out leprosy.

The essentials are—

(1) Sufficient dispensaries run by trained doctors who have studied the disease.

(2) Diagnosis if possible in the  $A_1$ ,  $B_1$ , stage.

(3) Treatment, consisting in carrying out special treatment, in removing predisposing causes and in increasing the general resistance of the body.

Existing treatment by the esters of hydrocarpus, chaulmoogra and other oils is very effective, but has never been considered a "specific" (in the sense that it would unaided cure every case subjected to it) by anyone who has had anything to do with its application.

It is questionable if such a specific will ever be found either for leprosy or for the sister disease tuberculosis. Leprosy as an indigenous disease was stamped out of England long ago while tuberculosis is disappearing tardily 300 years later. There is every reason to believe that leprosy can be stamped out of India and other tropical and subtropical countries simply by the means suggested above and without any so-called specific.

As far as I can understand its objects, this is what the new British Empire Association is out to do and, if it does not succeed it will not be for want of a remedy to hand, but for want of sufficient support being given to its efforts.

TABLE

		LENGTH OF TREATMENT IN MONTHS								
		1—3	4—6	7—9	10—12	13—15	16—18	19—21	22—24	Over 24
$A_1$	All signs of active disease gone	1	4	4	7	3	6	3	2	2
	Still signs remaining	13	5	2	9	2	3	2		
$A_2$	All signs of active disease gone	5	5	3	1	1	1	2	1	19
	Still signs remaining			1	4	1	1		1	8
$B_1$	All signs of active disease gone	10	4	3	2	5	1			23
	Still signs remaining				1		1	1		3
$B_2$	All signs of active disease gone	21	6	5	8	6	6	3	3	68
	Still signs remaining									
$B_3$	All signs of active disease gone	5	1	1	1	6				14
	Still signs remaining									
TOTAL		55	25	19	33	22	19	11	7	12
										203

$A_1$  = Primary nerve cases

$A_2$  = Secondary nerve cases coming on after  $B_2$  and  $B_3$

$B_1$  = Bacteriologically positive cases of 1st degree

$B_2$  = Ditto of 2nd "

$B_3$  = Ditto of 3rd "

This is a table of 203 dispensary cases that have persisted with treatment up to date or of a relative, cure, other cases showed marked improvement but left off treatment for various reasons before they were considered relatively cured.

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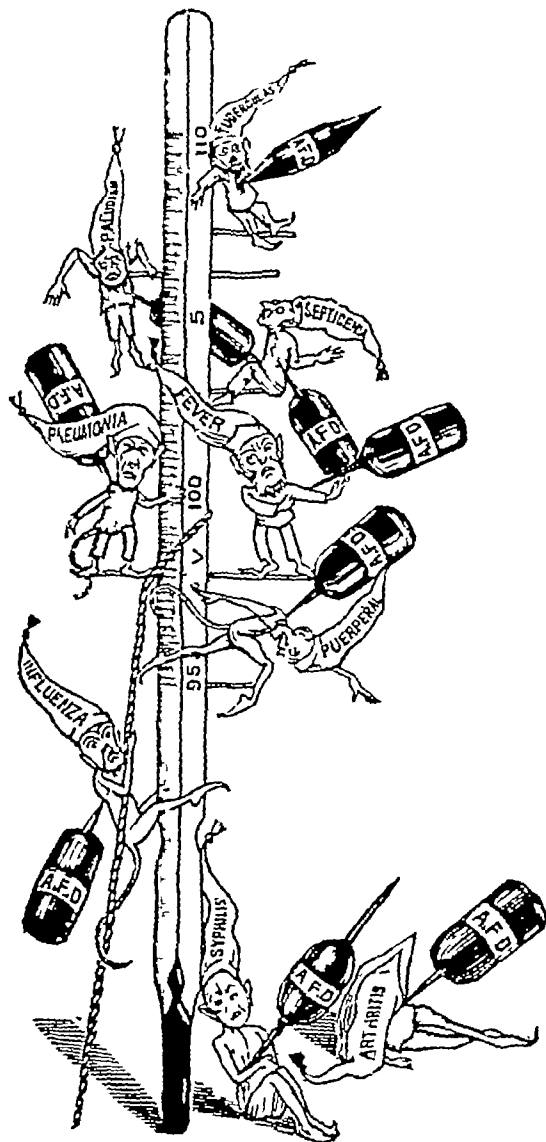
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JUNE

## THE LEPROSY PROBLEM

It is only within the last few years that the leprosy problem can be said to have come into existence in India. Formerly, leprosy was supposed to be a hereditary, incurable, loathsome disease, the mark of special disfavour of the gods for some offence committed in a former state of existence. That being so, the disease being irremediable, no problem could exist, except that of seeking some method of disposing of the poor unfortunates whom Heaven has left on our hands. This difficulty was got over in different ways with different degrees of thoroughness, from that of the Chinese monarch who had lepers buried alive to that of the Mission to Lepers who provided them with homes and asylums where they could spend their lives with a degree of modest comfort till the fatal issue occurred. Leprosy had for years been the Cinderella of diseases, ignored even by medical men, who knew little of its early symptoms and thought of it only in its advanced stages of disfigured faces mutilated hands and feet, and loathsome ulcers. It is little wonder that the popular conception of the disease corresponds with that of the medical profession.

Careful study of the disease has brought to light the fact that for every case which advances to this terrible condition, there are several cases in which the symptoms are quite trivial and in which no more inconvenience is ever caused than would be caused by a few patches of ring-worm, indeed there seems to be evidence that, as in the case of tuberculosis, many persons are infected who never develop the disease to a sufficient degree to be diagnosed during their life time.

The Royal Commission which was sent out to India to investigate leprosy in 1890-91 gave it as their conclusion "that there is no evidence that leprosy in India is transmitted through heredity from parent to child." Since 1892 much evidence has been brought to light to confirm this pronouncement of the Royal Commission, and we may take it that the fallacy that leprosy is a hereditary disease has been finally disposed of.

There are, however, still prevalent certain misconceptions regarding leprosy —

- 1 That it is a steadily progressive disease which is invariably fatal in the long run
- 2 That it is not amenable to any treatment

3 That it is highly infectious

4 That it is inherently loathsome and in a special way a punishment for sin

In the majority of those who are infected with leprosy, the disease is not of itself fatal. Indeed, there is good reason to believe that its normal course is that of a self-healing disease like small-pox, enteric and other such diseases, only that whereas enteric completes its course in, say, 21 days, leprosy may take 21 years to burn itself out. As after an attack of small-pox the scars still remain, so leprosy leaves its scars in the form of depigmented patches, fibrosed nerves, paralysed and wasted muscles, contracted and shortened fingers and toes and trophic ulcers. There is reason to believe that many (though not all) of the terrible looking sores and deformities which lepers exhibit to the public to elicit alms, are no more liable to spread leprosy than pock-marked people are liable to spread small-pox or the empty orbits of the blind to spread ophthalmia. The evidence in favour of this is the failure to find *lepra bacilli* in such cases even after a prolonged and careful search and the absence of all signs of progressive disease. Such cases generally die of neglect and of septic complications which could be prevented by a reasonable degree of care.

In the strictly scientific sense, few cases of the disease are curable, but in many it becomes arrested before much damage is done, and this arrest is much more likely to take place if the patients are treated on rational lines, the improvement of their general health on the same lines as are adopted with tuberculous patients will enable many cases to secure the arrest of their disease apart altogether from special treatment. One great factor in the treatment of leprosy is the instillation of hope into the mind of the patient. Nothing is so stimulating to the body resistance as hope, nothing so depressing to vitality as despair. We have, therefore, the curious situation that suggestion is a most important factor in the treatment of leprosy. Unfortunately the suggestion that has been made to the patient in the past has been that he should "abandon all hope." For this reason it must be admitted that medical men in the past have done little but harm to their leper patients, these have asked bread, they have been given a stone. Most of the treatments of leprosy which have had any considerable vogue owe a great part of their temporary successes to the fact that leprosy often tends to get better spontaneously, and that hopeful suggestion greatly helps the tendency to cure.

The outlook for the leper is now vastly brighter than it was, thanks chiefly to the work of Sir Leonard Rogers, who combines a genius for research with a marvellous aptitude for business.

The story of the discovery of sodium gyno-cardate, of the ethyl esters of chaulmoogra oil and of the other substances which are used in the treatment of leprosy is familiar to all our readers

The present position is that the majority of cases of leprosy which have been treated by these modern methods have shown great improvement, and in many cases they have been "cured" in the popular sense. There is still room for doubt as to the share of credit which should be attributed to the special treatment and the share which is due to suggestion and to the improvement in the patient's hygienic conditions which usually accompanies the treatment. It will take a long time to arrive at a definite decision on this point, but it appears to be established that the modern treatment does exercise a very favourable influence on patients, especially in the early stages of the disease. Exaggerated claims, such as have been seen in the press will do no good to the cause of the anti-leprosy campaign, they will be followed by disappointment and do harm in the long run. On the other hand, it is not easy to understand the attitude of those who loudly proclaim that there is no justification for the claim that a cure for leprosy has been discovered. It is necessary to emphasize the fact that neither Sir Leonard Rogers nor any other competent scientist has claimed that a radical cure exists. What is claimed is that large numbers of lepers who are subjected to rational treatment, of which the special injections form an important part, have benefited very greatly, and that many of them are to all intents and purposes "cured". Early cases of leprosy treated in this manner usually respond in a satisfactory way. We are, therefore, justified in declaring with the greatest emphasis that it is a criminal blunder to assert that leprosy is not amenable to treatment. It is perhaps equally wrong to claim that there is a specific cure for leprosy, the truth which will prevail in the long run is that leprosy is a disease which can be very greatly benefited by treatment when intelligently and persistently carried out, the majority of early cases having a fair chance of losing all signs of active disease and remaining free from them for the rest of their lives, provided that their general health and resistance are maintained.

Another important point is that in the vast majority of cases leprosy can be diagnosed by nerve symptoms long before it is possible to find lepra bacilli and therefore, presumably, before the patient has become infectious and a danger to his associates. It follows that many of such cases need never leave their employment, provided that facilities are available in the locality for efficient treatment and advice. In this way the patient is enabled to lead a healthy life, saved from despair, shame,

lack of employment and of sufficient means of subsistence, all of which tend to cause rapid exacerbation of the disease. At the same time the danger of the patient infecting others is likewise removed.

The infectiousness of leprosy has been greatly exaggerated. In any country in which the incidence of the disease remains the same over a long period of years, each victim on the average communicates the disease to one other person. Some of the patients are much more dangerous than others. If these are properly treated and reasonable precautions are taken to prevent them from spreading the disease, it is certain that the disease will rapidly diminish.

The programme to be adopted should therefore consist of—

(1) The providing of dispensaries and facilities for early diagnosis, treatment and advice. This implies the thorough training of the medical profession with regard to leprosy.

(2) Propaganda to instruct the public in the true nature of the disease.

(3) Segregation in separate rooms of infectious cases so that they avoid contact with healthy people.

(4) The providing of colonies and hospitals for the segregation, employment and treatment of infectious patients who have not the facilities for segregating themselves in their own houses, and for all leprosy patients for whom for any reason proper treatment is not available while living in their own homes.

We welcome the new Association for the Relief of Leprosy in the British Empire lately inaugurated in England and wish Sir Leonard Rogers the success which he is so amply earning in his powerful and many-sided efforts to deal with the disease.

## A Mirror of Hospital Practice.

### BUTYN AS A LOCAL ANÆSTHETIC IN OPHTHALMIC SURGERY

By MAJOR R. M. DICKSON, R.A.M.C.,  
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MANY attempts have been made during the past twenty years or more to discover an efficient substitute for cocaine as a local anæsthetic.

In ophthalmic surgery at least, butyn appears to be more than a substitute, as it is superior to cocaine in several respects.

Butyn is a synthetic preparation of coal tar, and there are no restrictions as to its purchase.

It produces no exhilarating effects, and there is, therefore, no danger of it becoming a drug



of addiction. The importance of this point cannot be exaggerated, as the illicit use of cocaine has become a widespread social evil and is much more prevalent in India than is generally recognised.

Butyn is more powerful than cocaine, a smaller quantity being required. It acts more rapidly than cocaine, and its action is more prolonged. It is less toxic. There is no drying effect on the tissues. It does not dilate the pupil. It can be boiled without impairing its efficiency.

Butyn has been extensively used in America as a local anæsthetic, and for the past two years Mr W. M. Beaumont of Bath has strongly advocated its use in ophthalmic surgery.

The fact that butyn does not deteriorate on keeping is of great value in India, where the deterioration of cocaine occurs to such an extent that it is a common experience in eye work to resort to a twenty per cent or even stronger solution. In order to test this property of butyn, a two per cent solution was purchased in a sufficient quantity to last throughout the hot weather in the Punjab. Ten months later this solution was in use for cataract operations, and there was no evidence whatever of deterioration.

The first instillation of butyn into the conjunctival sac produces a slight degree of hyperæmia, which is not increased by subsequent instillations. This is of no consequence in eye work as it is readily controlled by adrenalin, and in this connection I have found it an ideal anæsthetic.

#### METHOD OF ADMINISTRATION

For cataract operations, iridectomy, etc., a 2 per cent solution is required. It should be given in three instillations at intervals of two minutes, followed by two drops of adrenalin.

The operation can be performed two minutes after the last instillation.

For foreign bodies in the cornea or conjunctiva, a 1 per cent solution is sufficient.

Tenotomy and advancement of the muscles, excision of the lachrymal sac, and operations on the lids are satisfactorily performed with infiltration with a 0.5 per cent solution.

It must be remembered that butyn has a certain degree of toxicity, and that smaller doses are required than in the case with cocaine.

One objection raised against butyn is its excessive price as compared with cocaine. It is of little value however to compare the prices of the two drugs, on account of the rapid deterioration of cocaine. Mr Beaumont has pointed out that the present price of butyn works out at six drops a penny for 2 per cent solution, sufficient to do a cataract operation. Butyn can be purchased in powder

form in bottles of 5 grammes or less. It is readily soluble in distilled water.

In the opinion of Dr Mathra Dass of Moga who has performed over 68,000 cataract operations, the percentage of cases of prolapse of the iris following expression of the lens in its capsule is a criterion of the efficiency of a local anæsthetic.

It is certain that prolapse is more common after expression of the lens under deteriorated cocaine. It is satisfactory to note that prolapse following the use of butyn and adrenalin appears to be decidedly less frequent than in the case with cocaine. This point requires further investigation, and could only be established after prolonged experience with a large number of cases.

#### PERSONAL EXPERIENCES

Butyn was first tried by me in eye work in September 1922. It was used in a variety of cases, and proved so satisfactory that it was determined to give the drug a thorough trial. A few months elapsed, however, before it was available in India.

I have now used butyn in over 600 cases, excluding minor operations such as foreign bodies in the cornea, of which I have had a large number.

These cases included 348 cataract operations, the great majority of which were expression of the lens in its capsule, an operation which I consider requires a more profound anæsthesia than capsulotomy.

The remainder of the series included the usual every day variety of eye operations, e.g., operations on the muscles and the lids, excision of the sac, iridectomy, etc., and a few cases of eversion.

I have found the drug most reliable, it has never failed me in a single case, and up to the present I have found it an unqualified success in ophthalmic surgery.

In conclusion, I may add that I have never had occasion to resort to cocaine since the supply of butyn became available in India just over a year ago.

#### SUPERNUMERARY SPLEEN WITH NOTES ON A CASE OF A RARE TYPE

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CAPTAIN, I.M.S.,

Civil Surgeon, Dera Ismail Khan

ALEXANDER and Romanes(1) in an excellent review of this subject and its literature observe "the frequency with which the pathologist meets with accessory spleens at necropsies makes it rather remarkable that their presence is rarely noted by the operating surgeon." They proceed to quote such high authorities as Adams and Nicholls, and Sherman as to the frequency of supernumerary

spleen post-mortem which the former authority, they say, puts at 11 per cent

On the other hand, in standard text-books of surgery, they only found one casual mention of this abnormality "and that merely as an anatomical fact" They further quote Albrecht, of Vienna, as reporting a case in which "an enormous number of supernumerary spleens were found, in the usual situation was a normal spleen the size of a walnut, with the splenic artery and vein in their normal position The other spleens were scattered not only in the meso-gastrium but also on the peritoneum—as for example, on the hepatic ligaments and on the convexity of the liver—there were more than 30 in Douglas' pouch" W J Mayo has found supernumerary spleens in the pedicle, during splenectomy for tumour, etc

With the exception of this excellently worked out article and the authorities quoted therein, the literature of this subject does not seem to be voluminous De Teyssieu (2) records a case in which an accessory spleen was discovered *pm* embedded in the liver of an elderly female lunatic Linder (3) records a case in which a splenoma of a supernumerary spleen between the layers of the gastro-colic omentum was discovered by laparotomy and removed In view of the case to be recorded, it is an interesting point that Linder's case showed a left inguinal hernia Cases are further recorded by Jolly (4), Lamphear (5), Temoin (6) and Younge (7) Temoin's case presents the interesting feature that the supernumerary spleen simulated an intestinal growth Sir Arthur Keith (8) states that small masses of splenic tissue (accessory spleens) are occasionally found near the hilum of the spleen Thus the great preponderance of the literature deals with supernumerary spleens not remotely removed from the normal situation of this organ, while the following is of another type —

A K, Mohammadan male, aet 40, was admitted to the Civil Hospital, Dera Ismail Khan, on 27th June, 1923, for radical cure of an inguinal hernia

About 4 years previously he had noticed the swelling after playing the local national game of "Doda" in which one man runs, and two others chase him and "tackle" him in any way they can The game, as is evident, involves a considerable amount of exertion

On admission the patient, who was a fine, sturdy Pathan of middle height, had an elongated swelling in the left inguinal region which formed on coughing and was reducible The swelling protruded through the external abdominal ring but did not reach the scrotum The ring was of normal size, taking the tip of the little finger, upon which, on the patient coughing, a marked impulse could be felt No other abnormality could be detected

*Operation*—An incision was made in the usual situation and the aponeurosis of the external oblique divided over the inguinal canal What appeared to be a thick-walled hernial sac was defined and opened Free fluid escaped and pressure upon the left testicle through the towels increased this However, a probe inserted into this "sac" passed neither up into the abdomen nor down towards the scrotum After further blunt dissection the true hernial sac was found above and internal to the "sac" originally opened, but communicating with it in its infero-external part by a very narrow opening In view of this unusual condition the hernial sac was widely opened at once, and was found to contain a small dark red structure, indistinctly reniform in appearance, along the convex (and infero-external) border of which, and closely connected to it, ran a white glistening cord-like structure which continued upwards through the internal abdominal ring, and, as far as could be followed by the finger, appeared to extend upwards towards the left loin

On tracing this cord-like structure downwards, it passed through the narrow opening connecting the hernial sac (A in the diagram, fig 1) with that originally opened (B) which was much thicker walled, and traversing B, passed into a close fitting thick-walled serous lined tunnel (C), which was continuous at its lower end with an apparently normal tunica vaginalis, to end splayed out over the upper pole of an apparently normal testicle The vas deferens (D) was normal in its normal situation behind the sac, and at the internal ring could be traced turning downwards and inwards round the deep epigastric artery in the usual way, which disposed of the first idea that one was dealing with an abnormal vas with a hæmatoma upon it The condition was so unusual that the whole series of structures, A, B, and C, were isolated by blunt dissection and, the tunica vaginalis having been opened, was dealt with as in radical cure of hydrocele The cord-like structure was then divided between double ligatures just above the testicle, and pulled down as far as was deemed safe through the internal abdominal ring where the procedure was repeated as high up as possible, and cord and tumour removed Radical cure of hernia was then completed by Bassini's method and the wound closed and the patient returned to bed Recovery was uninterrupted and the patient left hospital on the eleventh day after operation

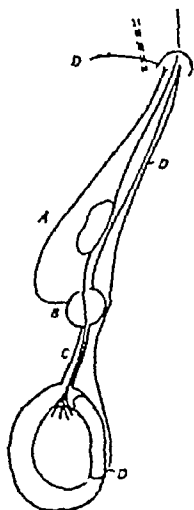
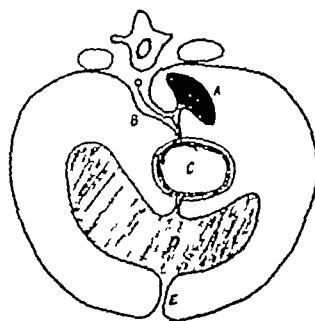
The tumour, on section after the operation, presented a finely trabeculated appearance—the adjective suggested itself as the only apt one at the time, before any idea had occurred to me as to the nature of the tumour—which completely disposed of the theory

that it might be a hæmatoma of an accessory vas deferens, and it was accordingly despatched in 5 per cent formalin, to the Central Research Institute at Kasauli for microscopic examination. The report of Captain L. A. P. Ander-

Hospital. The following is an extract from his letter in reply —

"The solid mass in the sac is unquestionably an accessory spleen. Its histological structure is typical."

FIG I

FIG II  
After KeithFIG III  
After Keith

A Spleen  
B Dorsal mesogastrium  
C Stomach  
D Liver  
E Ventral mesogastrium

A Developing genital gland  
B Gut  
C Wolffian duct  
D Intermediate cell mass  
E Caudal spread of splenic tissue.  
F Hypothetical leftward spread

son, I M S, the Assistant Director, is as follows —

"The tumour itself consists of a mass of lymphoid tissue partially divided up by fibrous trabeculae running into it from the capsule. Scattered throughout the mass are denser nodules of lymphoid cells, generally in association with small blood vessels. Some of these present an appearance suggestive of early tubercles, but in any more usual situation one would say that they resembled very closely the Malpighian corpuscles of the spleen. The whole tissue bears a strong resemblance to spleen or hæmolympth gland tissue, and the possibility that the tumour may be a developmental abnormality arises. It may be remarked that an accessory spleen has been described by Rolleston as extending down into the scrotum."

"The cord-like structures consist of a stout fibrous capsule which appears to spread into and form the capsule of the main mass, with which the cord is intimately connected. The cord contains four rather large blood vessels and about six smaller vessels, and for the rest is of a delicate connective tissue stroma."

I regret that I have been unable to trace Rolleston's case.

In view of the extremely interesting suggestion made by Captain Anderson, the specimen was sent to Mr Davies Colley at Guy's

"The cord-like suspensory ligament no doubt carried it down with the testicle, to which it is attached, during the latter's descent into the scrotum. I have no doubt that if it were followed to its abdominal attachment it would be found to be springing from the root of the spleen itself."

*Remarks*—The nature of the tumour being thus established, it becomes of interest to enquire into the genesis of such an anomaly. As Mr Davies Colley points out "the testis, in its original position is quite close to the spleen on the left side." Mere propinquity, however, though suggestive, does not completely account for the occurrence. It will be remembered that the spleen is developed in the dorsal mesogastrium of the embryo, appearing first as a localised growth in the mesoderm of the mesogastrium at the beginning of the sixth week of foetal life (9). At this time, the growth of the lung buds is forcing the stomach tail-wards from its original cervical position, and it takes up its position—and with it the mesogastrium—level with the lower thoracic segments, (10). At the same time the genital ridge on the inner side of the Wolffian body, from the hinder part of which the testicle is developed, extends from the sixth to the twelfth thoracic segments, (11), the actual primitive genital gland lying in the iliac fossa.

How, then, is the association of the spleen, which is a structure developed in the dorsal mesentery of a portion of the fore-gut, with the testicle, which develops in the mesoderm adjoining the mesentery of the mid-gut, to be explained? A possible clue is found in the statement of Colin Mackenzie quoted by Keith (12) that in lower mammals the splenic formation spreads backwards (caudal) even into the mesentery of the hind-gut, to form the "colic lobe." An atavistic persistence of this condition in the human being explains the presence of accessory spleens in Douglas' pouch in Albrecht's case—since the disappearance of the meso-rectum would leave them stranded in the situation. It is also not difficult to imagine that a localised extension to the left of this atavistic caudal prolongation of splenic tissue (Fig III F) might come into close relationship with the adjacent developing testicle, a relationship which might easily extend to a secondary vascular connection, the vessels acting as a suspensory ligament and assuring the migration of the localised extension. The vessels of testicular origin would be represented, in the case reported by the cord below the tumour, and those of mesenteric origin by the same structure above it. Such is a possible, and to my mind probable, explanation of the intimate association of an accessory spleen with the testicle. An interesting feature of the case is the evidence of gallant attempts on the part of the processus vaginalis at closure, represented by the various parts of the hernial sac, tunnel, sac B and sac A.

I am greatly indebted to Lt-Colonel Christophers and Captain Anderson, I.M.S. and to Mr Davies Colley for their kind and careful examinations of the specimens.

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## A STRANGULATED DIAPHRAGMATIC HERNIA OF THE STOMACH

By DR A BAYLEY-DE CASTRO,

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I PUBLISH this case because of its rarity and of the obscurity of the symptoms

Behari, a Hindu male, aged 35 years, well nourished and well developed, was admitted into the ward for free people, attached to the Convict Hospital at Haddo, on the 8th March, complaining of pain in the splenic region. He gave a history of fever of three days duration. The spleen could be palpated 1½ in below the left costal arch. The abdomen was quite soft. Liver dullness normal. Heart sounds and precordial area normal. Right lung normal. Left lung complete absence of inspiratory sounds up to 2 in of the apex of the upper lobe and the very faintest of expiratory vesicular murmurs heard only occasionally along the vertebral border. There was the scar of a wound between the 5th and 6th ribs on the left side, in the anterior axillary line, the result of a stab seven years previous. Tongue normal, clean and moist. The patient stated that his bowels had not been opened for three days. Blood examination was negative for malaria and a differential count was normal. Pulse 78. Temperature normal. He was given a simple enema, which after a few minutes was returned without any faeces.

As there was a slight amount of nausea, he was ordered a carminative mixture, a sinapism applied over the spleen and quinine gr  $\times$  b d was prescribed.

At 7 p.m. his pain became very severe, but the abdomen was still soft and palpation did not elicit increase of pain, also he lay on his back quite straight in bed. He again passed the remark about the bowels not acting.

A rectal examination did not reveal anything abnormal. As there was nothing to indicate intestinal trouble, a dose of oil was ordered, and ½ gr of morphia hypodermically at bed time.

9th March, 1924—Morning and evening temperature normal, pulse 84, still in pain, but nothing very severe. Ordered turpentine stupes and a turpentine enema.

10th March, 1924—Morning and evening temperature normal, pulse 84, pain still complained of in the left hypochondrium. Vomited some clear glairy fluid, which was not acid, and had no smell. Complained of nausea, and inability to pass wind. Abdomen in the same condition as before. Respirations 20 p.m., tongue clear and moist.

Former treatment stopped. Was ordered a sinapism over the pit of the stomach, ice to suck and a draught of chloral and tinct opii to allay the sickness. Milk and soda to be sipped in small quantities.

11th March, 1924—Morning and evening temperature normal. Stated that he had had very little sleep. Vomited twice during the night, pain less. The liver and gall-bladder area was carefully palpated but nothing wrong was discovered. No jaundice, urine analysis normal.

Patient's face was pinched, and his expression was becoming anxious. He complained again of not passing flatus or faeces. Condition of abdomen flat and soft, tongue still clear and moist, temperature normal, pulse 120.

I may here remark that the anxious expression of the patient and the steady rise in the pulse rate were the only indications of some grave condition.

At 7 p.m. the temperature rose to 99.4, the patient had a severe attack of retching and vomiting and almost collapsed. Pulse feeble and rapid, expression very anxious.

The vomited matter was glairy and dirty in colour, vomiting did not relieve the pain. The patient was speechless, but this I think was due to fright. I again examined him, and the absence of breath sounds from the left lung I put down to an old thickened pleura, the result of pleurisy due to the wound between the 5th and 6th ribs. I must acknowledge that I did not notice or suspect the absence of the stomach from its normal anatomical site. The abdomen was still soft and doughy.

12th March, 1924—Temperature normal, pulse 140. Expression very anxious, complaints as formerly, inability to pass flatus, nausea and vomiting persistent.

The vomited matter was colourless but of the coffee ground type. It was not acid. The tongue was 'clear red moist, and steady' and as pain was now felt just below the xiphoid cartilage, the possibility of a gastric ulcer was thought of.

After a consultation at which Dr Hussey of Viper Island was present it was decided to open the abdomen and be prepared for all eventualities, as doubt still existed as to the correct diagnosis.

Operation was performed under a general anæsthetic. An incision 3½ in long was made in the middle line 1 in above the umbilicus and on entering the abdominal cavity the first thing noticed was that the vessels of the omentum and mesentery were found to be much engorged and in a condition of thrombosis and the coils of small intestines immediately in view were congested. The omentum was thickened. The small intestines contained fecal matter of semi-solid consistency. The duodenum was pulled upwards and to the left. The gall-bladder was next examined and found to be normal.

A search was then made for the stomach, and now for the first time it was noticed to be absent from the abdominal cavity.

This search occupied quite a long time because of the adhesions that had to be broken down all around, but finally following up the duodenum it was discovered to lead to the left thoracic cavity through an opening in the diaphragm.

The original incision was now enlarged upwards to the xiphoid, and from the lower end horizontally across the left of the abdomen to the level of the costal arch thus forming a triangular flap which on being reflected upwards and outwards exposed to view the whole of the herniated area.

The opening in the diaphragm was an inch to the left of the left crus and 2½ in in front in the nipple line and was a little bigger than a rupee in size. This wound was undoubtedly caused by the stab 7 years previous. The lower lobe of the left lung had completely collapsed, the result of pressure caused by the stomach. The stomach had prolapsed through this opening into the left thoracic cavity up to about an inch from the pyloric end. With gentle but firm traction it was at last got down. The gastro-epiploica dextra and senestra vessels and their branches were engorged and the stomach itself was covered with dark subserous hæmorrhagic patches scattered all over. The pyloric end was darkly congested there was a hæmorrhagic patch about 1½ in in circumference at the fundus of the greater curvature resection however was not called for. The rent in the diaphragm was now sutured but before this was finished the patient began to sink, energetic restorative measures had to be adopted with unfortunately futile results and a fatal issue.

Then followed a series of four abortions at about the third month. These abortions appear to have been the result of a retroversion of the uterus, because after the fourth abortion an abdominal operation was performed and the uterus "stitched up." The pregnancy which followed this operation resulted in a live full-time child but it was complicated by some difficulty in the delivery of the placenta and there was considerable post-partum hæmorrhage. Then followed two more deliveries at term with no difficulty except with the afterbirth, the separation and expulsion of which was accompanied by severe hæmorrhage.

When admitted for the confinement now to be described, the patient's general condition was good. Her pulse rate was 80 per minute, the temperature was 97°F, there was a history of the membranes having ruptured six hours previously, and she was experiencing strong pains at intervals of about twenty minutes. Inspection of the abdomen revealed an operation scar extending from the umbilicus to just above the symphysis pubis. There was an ovoid swelling with its long axis oblique, the lower pole occupying the left iliac fossa and its upper extremity lying beneath the right lower ribs. The child was firmly embraced by the uterus so that its various parts could not be identified by palpation. The fetal heart was heard a little below and to the right of the umbilicus and its rate was about 130 per minute.

On vaginal examination only the anterior edge of external os could be reached, it was situated high up and posteriorly on a level with the sacral promontory, so that the external os was directed almost directly backwards.

In front of the backwardly directed os uteri the sensation imparted to the examining hand was that of a soft thick mass of tissue, but no portion of the fœtus could be identified. It was therefore obvious that one had to deal with a case of anterior sacculation of the uterus secondary to a previous ventro-fixation operation, and since the cervix could not be reached the condition constituted an absolute indication for Cæsarean section.

On opening the abdomen a thick band was seen about 1 in long stretching from the anterior surface of the uterus to the anterior abdominal wall and situated about 3 in above the symphysis pubis. The uterus was opened and a full-time child weighing 6½ lbs, was extracted without difficulty. In order to facilitate the suturing of the uterus an attempt was made to bring the emptied organ outside the abdominal cavity, this, however, was found to be impossible and the uterine sutures had to be passed with the organ in situ. The impossibility of delivering the uterus outside the abdomen I attributed to the fact that only

## CLINICAL NOTES ON SOME INTERESTING CASES OF DIFFICULT LABOUR

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*Surgeon to His Excellency the Governor of Bombay*

(Continued from I. M. G., May 1924, p. 244)

*Case III. Ventro-fixation necessitating Cæsarean Section.* R., a Hindu woman of 35 was admitted in labour at 10-15 p.m. on November 3rd 1917. She was now pregnant for the tenth time. A complete history of all her previous pregnancies was difficult to obtain but the salient points in these were as follows—

Her first pregnancy ended in a premature labour at the seventh month, the second labour was normal and a live child was born

a portion of the uterine wall had become stretched *pari passu* with the growth of the foetus, viz, that portion of the anterior uterine wall situated above the ventro-fixation band, the fundus and its posterior wall, whilst that portion of the anterior wall of the uterus extending from below the fixation band to the internal os could only be capable of being stretched to a very limited extent. In other words, the posterior uterine wall was the segment of the uterus which had undergone most stretching in order to accommodate the child.

In the case under consideration the malpresentation must have added to the degree of stretching of the posterior uterine wall, and doubtless, had the case been left to nature rupture of the posterior part of the lower uterine segment would have been the inevitable result.

Having realized that increase in the capacity of the uterus had taken place mostly at the expense of its posterior wall, it is easy to understand that as soon as the organ was emptied, its much over-stretched posterior wall retracted to such an extent as to prevent the organ from being delivered outside the abdomen.

The patient made an uninterrupted recovery, and both mother and infant were discharged from hospital quite well on December 1st, 1917.

Ventro-suspension properly performed very rarely leads to dystocia, and most women who have had this operation performed according to modern methods pass through their confinements in a perfectly normal manner. It is even questionable, I think, whether it is wise to warn such patients that there is a possibility of difficulty arising in a subsequent confinement. Not very long ago I attended an officer's wife on whom ventro-suspension had been performed by a well known gynæcologist, this lady had somehow acquired the knowledge that Cæsarean section is sometimes necessary after the uterus has been thus supported, and I cannot help thinking that this knowledge acted quite otherwise than as a tonic to her nervous system. Her confinement was uneventful in its normality, the only artificial aid given being chloroform during the latter part of the second stage. It is another matter when the uterus is firmly fixed to the anterior abdominal wall over a considerable area, and especially when this fixation is carried out too near the fundus uteri.

*Case IV Placenta prævia and Cæsarean section.* One meets with only a few cases of placenta prævia in which the condition of both mother and child justifies the operation of Cæsarean section. This is more especially so in hospital practice where such patients are usually admitted in a more or less advanced

stage of labour and only after there has been a considerable loss of blood, a state of affairs which would obviously contra-indicate a major operation when other means of delivery are open to us.

In recent years it has been recognised that the best treatment for certain cases of placenta prævia is Cæsarean section, and the results obtained among these carefully selected cases have been very satisfactory both as regards the maternal mortality and that of the infants. The maternal mortality of placenta prævia treated on the ordinary lines is 4 to 8 per cent, and the average foetal mortality is 60 per cent. Munro Kerr says "The best figures give 4 per cent, and 35 per cent respectively, and they are as low as one can ever expect to reach with the present recognised methods of treatment." But in certain cases of placenta prævia, such as the one described below, Cæsarean section would, I think, justify us in expecting much better results.

As regards the mother, there seems no special reason why Cæsarean section performed in suitable cases of placenta prævia should not yield quite as good results as it does in cases of contracted pelvis, when the operation is performed under the best conditions, the maternal mortality then being 29 per cent (Amand Routh). Berkeley and Bonney place the maternal death-rate of Cæsarean section, when this operation is performed under the best conditions, as "probably under 1 per cent." In well-selected cases of placenta prævia the maternal mortality should not, therefore, be greater than about 2 per cent, i.e., about half as great as we could expect from any other method of treatment. One other great advantage to the mother is a lesser risk of morbidity as compared with that which results from the necessary manipulations, often prolonged, which accompany delivery *per vias naturales*.

The foetal mortality must obviously be very greatly reduced by Cæsarean section, and the rate of 35 per cent at the best would be reduced to one of about 5 per cent. Further, in most cases the mother should be as well able to nurse her infant as after normal delivery, a result which, because of some slight sepsis or as the result of hæmorrhage before and during delivery, is often denied to the mother who has been otherwise delivered.

Generally speaking, the operation of Cæsarean section in a case of placenta prævia is indicated under the following conditions (1) when the hæmorrhage has not been excessive and the maternal pulse is full and its rate not above 100 per minute, (2) when the cervix is undilated and appears to be unduly rigid, indicating that dilatation is likely to be slow and difficult, as is often the case in elderly

primiparæ, (3) when the surgeon can be confident that there is no risk of sepsis from previous frequent vaginal examinations, etc., (4) the pregnancy should have reached full term or very nearly so, and the foetal heart sounds must be good, (5) another factor which should influence the surgeon in deciding in favour of Cæsarean section is the co-existence of some disproportion between the size of the foetal head and the maternal pelvis, and (6), as in the case here described, when the parents are especially desirous of a live child. The following case will serve to illustrate these points —

The patient, an Anglo-Indian, aged 32, was admitted under my care to the maternity department of the Sassoon Hospital, Poona, on October 19th, 1915. She had been married 12 years and the present was her first pregnancy. The last period ended on January 11th 1915, the probable date of confinement would be about October 16th, 1915. The patient stated that she had had slight pains for about 36 hours, bleeding began a few hours before she came to hospital. No vaginal examination had been made previous to her admission to hospital. When I saw her she was having feeble pains at about half-hourly intervals. Her general condition was excellent, the pulse being full and its rate 80 per minute, the face was placid and the tongue clean and moist. On abdominal examination the child was found to be in the first vertex position and the foetal heart sounds were good. The pelvic measurements were normal.

On vaginal examination there was still a definite and fairly firm cervix, which admitted one finger only, at the internal os only placental tissue could be reached.

Both the patient and her husband were very desirous of having a live child, and considering all the points of her case, I felt justified in advising abdominal section. Cæsarean section was therefore performed and a full-time live child was delivered. The bleeding from the placental site was somewhat excessive and for a moment rather disconcerting, it was certainly more than I had noted in cases of Cæsarean section in which the placenta was normally implanted. During the first few days after the operation there was a good deal of trouble from after-pains, otherwise the patient made an uneventful recovery, and both mother and child were discharged quite well on November 27th.

*Case V Eclampsia, Cæsarean section R*, a Parsi, giving her age as 16, but who appeared to be 20, was admitted under my care at 7-50 a.m. on the 1st July, 1919.

She was unconscious, her face was cyanosed and puffy and her breathing was stertorous, the temperature was 100.6°F, the pulse-rate was 140 per minute, and occasionally a beat was missed. The history obtained

from her relatives was to the effect that she had been married for 8 months, and that she had been quite well up to the day before admission. On that day at about 4 p.m. she complained of headache and this was followed by an attack of vomiting. At 7 p.m. there was a fit, and from that time up to her admission many other fits occurred, the exact number I could not obtain. Some of these convulsions were followed by unconsciousness for varying periods. Eight more convulsions followed from the time after admission to hospital until I was able to operate four hours later. There was no swelling of the feet or vulva, but the eyelids were cedematous and the face was a little puffy. The urine was smoky and on boiling was solid with albumen. An injection of morphia gr  $\frac{1}{4}$  with atropine gr 1/150 was given at 8-30 a.m., this suppressed the fits for a time, but then followed a very severe convulsion and others at intervals but not so severe. Abdominal examination showed the patient to be about 6½ months pregnant, the foetal heart was not heard, but auscultation was difficult because of the stertorous breathing. *Per vaginam*, the cervix only admitted the tip of the finger.

As to whether the foetus was alive or not was here of no moment, it was a question entirely of saving the mother's life. Her condition was obviously a desperate one, and one which fully justified the most radical treatment. My own opinion, after a not inconsiderable experience in this class of case, is that any dallying with morphia and saline treatment is waste of valuable time, the best treatment consists in the rapid emptying of the uterus by appropriate surgical measures, and when the cervix is not dilated the best operation is some form of Cæsarean section, either vaginal or abdominal.

In this case I selected the abdominal method, because the vagina was small and undilated. The anæsthetic used was  $\text{CE}_2$ , a recently dead male foetus of about seven months' gestation was extracted without any difficulty and after suturing the uterine incision the abdominal wall was sewn up in layers. An injection of 1 c.c. of pituitrin was given during the operation.

As soon as the patient was returned to bed a pint of sodium bicarbonate solution, of a strength of one drachm to the pint, was administered per rectum, in smaller amounts this was repeated until recovery was well established. Six hours after the operation the patient was drowsy and semi-conscious but no more convulsions had occurred, her pulse was now 110 per minute and much better than before the operation. Next day there was an obvious improvement in her general condition although the urine was still solid with albumen on boiling. Sodium



bicarbonate solution was administered rectally every four hours, and as much water as possible was given by the mouth.

On July 3rd, she was able to take milk and barley water every three hours. She was passing a large amount of pale urine, which now contained much less albumen. There was some distress from cough, the result of a bronchitis, which, however, did not last many days. By July 9th, she was well on the road to recovery. I had intended to remove the stitches on this day, in this I was almost forestalled by the patient, who feeling an itching sensation about the wound proceeded to remove the wool and gauze from beneath the binder and then dug her not very clean nails along the suture line. Accidents of this kind are not infrequent in surgical practice in the East and the most careful nursing can hardly cater for this. The sutures were removed and the wound, which luckily was only superficial, was cleaned with an antiseptic solution. On July 12th, there was still a very slight trace of albumen in the urine, and on August 3rd the abdominal wound having healed soundly, and there being no albuminuria, the patient was discharged.

*Case VI Small round pelvis—Dystocia Cæsarean section.* Mrs I, an Englishwoman, aged 37, first consulted me on the 19th February, 1919, she was then pregnant for the second time. Her first confinement took place in March 1918, the history of this event shows it to have been a long and tedious process. According to the patient a period of 4 days elapsed from the commencement of labour pains until the birth of the child, which was accomplished without forceps or other assistance. The child was asphyxiated at birth, which it only survived a few hours, she remembered that there were marks on the baby's head and she also stated that it coughed up blood.

Abdominal palpation showed the patient to be about eight months pregnant and the child to be lying in the 4th vertex position. The foetal head was freely movable above the brim of the pelvis. It was considered that March 12th, 1919, would be the probable date of her confinement.

The one thing which struck me about this patient was her small stature, her height being only 4 feet 8½ inches. Her pelvic measurements were as follows—The interspinous measurement amounted to 8 in, the intercrystal was 10 in, the external conjugate 7½ in, whilst the diagonal conjugate measured 4 in to 4½ in.

On the 10th March, 1919, labour commenced with a "show" at 10-30 a.m. and pains began a little later. The child was lying with its long axis vertical with the vertex presenting in the first position, the os admitted 2 fingers. Considering the history of her first labour, the

general smallness of the pelvic measurements, her small stature and the fact that the foetal head was freely movable above the brim and could not be pressed into the brim, I advised Cæsarean section as being the safest measure not only for the child, but also for the mother. The patient however refused operation. Fourteen hours later the os was found to be three quarters dilated and the membranes bulging into the vagina. There had been strong pains throughout the day, but despite this the head was still movable above the brim and there had been no advance. Consent was now given to operate. Cæsarean section was performed and a live male child delivered. The patient was able to nurse her child and both did well. This case shows how important it is to carefully measure the pelvis in every first labour, had this been done in this case much suffering would have been prevented and possibly a life saved perhaps by the timely application of forceps or more certainly by Cæsarean section. If delivery by forceps was impracticable, craniotomy should have been performed in the interest of the mother.

## ON A NON-OPERATIVE TREATMENT FOR HERNIA

By DR S MALLANNAH, M.D.,

*Chemical Examiner and Bacteriologist, H. E. H. the Nizam's Government Hyderabad, Deccan*

HERNIA being very common in India—according to Dr Mallannah's figures indeed it affects some 12 per cent of adult males and some 25 per cent of elderly Indian males—and patients being in dread of operative procedures and anaesthetics, any successful non-operative form of treatment is of interest. A truss often fails to cure and is merely palliative, indeed in the long run it weakens the muscles and this may enlarge the ring so that the hernia becomes larger with age. Of various medicinal treatments advocated Heaton advocated applications of white oak bark, Pancoast an application of strong ammonia to produce local inflammation and adhesions. The mortality from operative procedures is about 3 per cent (Coley), and the failure rate some 5 per cent.

Unsutured wounds of the skin heal by granulation tissue formation and the author accordingly considered the possibility of inducing some similar process in the mouth of the hernial sac. A vaccine was prepared of *B. pyocyaneus*, of strength 1 c.c. = 100 millions and a suitable case presented himself in the form of an adult Indian male with an inguinal hernia. The hernia was reduced and 1 c.c. of the vaccine injected into the internal abdominal ring. Cure followed.

*Technique*—The author's technique is as follows—“After getting the lower part of the abdomen and the scrotum shaved, the skin is painted with tincture of iodine. After reducing the hernia I introduce my left forefinger having painted it with tincture of iodine, into the internal abdominal ring after having passed the external abdominal ring and the canal. When I am satisfied that the finger is in the internal abdominal ring I keep it there straight and not bent, and with my right hand I introduce the needle alongside my left forefinger which forms a guide, into the internal abdominal ring keeping the needle quite parallel to the finger. I then inject the fluid just inside the internal abdominal ring and after withdrawing the



needle, I withdraw my left forefinger, and not till then. Or one of the assistants can pass his finger and the operator can inject the fluid by passing the needle alongside his finger. There are three points which ought not to be forgotten in this technique. 1 The finger introduced must remain straight and not be kept bent. 2 The needle should be introduced quite parallel to the finger. 3 The finger should be withdrawn after the needle is removed. A purgative is administered a day before treatment and complete rest is enforced for 10 days. The use of the bed-pan and of glycerine enemata is essential during this period. The injection is followed by a reactionary fever, the temperature rising to 100 to 102°F but being usually normal next morning. There is also usually slight tenderness over the part for a few days."

In addition to his own cases, the author records reports of the successful use of the method by Drs. J. C. Dutt, Moran, Assam, B. V. Surinayana, Kodmur, and V. S. Jagannathan, Poona, all in cases of inguinal hernia—(*Abstract from original communication*)

## ON A NEW TREATMENT FOR TUBERCULOSIS

By RAI DR. B. GHOSH BAHADUR,  
Hazaribagh

THE multiplicity of different remedies advocated for tuberculosis in all its forms merely proves the relative uselessness of most of them. For the past ten years the author has been experimenting with injections of a solution of formalin and ether, with a view to utilising the bactericidal action of the former, and the fat-dissolving action of the latter drug. The solution used is a one-half per cent. solution of commercial formalin in spiritus aetheris sulphatis, a dose of one-half a c.c. being given intravenously every alternate day until the temperature becomes normal, the night sweats stop, and the cough lessens. After this the injections are given twice a week until, on repeated examinations, no tubercle bacilli can be found in the sputum.

The author claims that in early cases 20 injections will bring about rapid amelioration, whilst 40 injections will cure the majority of cases.

The following are some of the cases recorded by the author—

*Case 1*—Hindu female, aged 24, with phthisis of at least 14 months' duration, accompanied by attacks of profuse hæmoptysis.

Tubercle bacilli present in the sputum. Cavitation at the apex of the right lung and scattered consolidated areas in both lungs. Minute doses of tuberculin and intravenous therapy with sodium morrhuate were first tried without success. On the formalin-ether injections the condition apparently cleared up in three months, but later relapsed, as the patient discontinued treatment against advice. The treatment was re-instituted, and at the sixth month from commencing treatment she was apparently well. The sputum showed no tubercle bacilli on repeated examination, and the only physical sign left was dullness at the apices. The patient was reported to be in good health a year after the cessation of treatment.

*Case 2*—European male, aged 16, with a marked family history of phthisis, his father having died of phthisis and his sister being an invalid from tubercular hip disease. Apices of both lungs involved, tubercle bacilli present in the sputum, fever to 102 to 104°F, and profuse night sweats. Sodium morrhuate injections having failed to relieve the condition, and diarrhoea having ensued and proved troublesome to treat, the formalin-ether injections were resorted to. In seven weeks the temperature became steadily normal, there was but very slight cough, and no tubercle bacilli could be detected in the sputum. At the end of six months the patient's weight had increased from 71 lbs. to 105 lbs., no tubercle bacilli could be found in the sputum, and there were no physical signs of

phthisis. The von Pirquet test gave a negative result, and two years after the cessation of treatment the patient was reported to be in excellent health.

*Case 3*—A Hindu male student with laryngeal tuberculosis, with multiple small ulcers scattered over the posterior part of the epiglottis. Examination of the sputum showed the presence of tubercle bacilli. In addition to the intravenous injections of formalin-ether, he was given cod-liver oil and iron orally and local applications of iodine and carbolic acid. At the end of six months the voice had regained its normal tone and there was no trace of throat trouble. The ulcers had disappeared, the injections were continued for one more month, and the patient was later reported to be in excellent health.

*Case 4*—Hindu male, aged 13, with tabes mesenterica. Had been in a hill station with prolonged treatment by tuberculin without improvement. When first seen was a chronic invalid. Thickened masses could be palpated in the abdomen, and there was diarrhoea with fever. No tubercle bacilli could be detected in the sputum, but the von Pirquet test gave a positive result, as also did Morro's test. The patient made an uninterrupted recovery, and two years after the cessation of treatment was reported to be in good health.

*Case 5*—Mahomedan female, aged 30, with hæmoptysis, fever rising to 103°F, and profuse night sweats. Tubercle bacilli not detected in the sputum, but marked physical signs of a large cavity at the apex of the right lung, and moist rales over both lungs. After 10 injections, the patient had put on 5 lbs. in weight, was able to walk about, and after 14 injections decided to discontinue treatment as she considered herself cured, despite advice to the contrary. Not traced subsequently.

*Case 6*—Hindu male, aged 28, police constable with two years' history of phthisis. Tubercle bacilli present in the sputum and signs of infection at the apex of the left lung. After 9 injections had markedly improved, but was then transferred to another district and has not been heard from since.

*Case 7*—Hindu female, aged 25, with a fistula-in-ano of two years' duration. Operation followed six months later by recurrence, and area opened and curetted, caseous masses removed. After an attempt at healing, inflammation recurred, treated by intravenous iodine and local dressings. Put on to treatment with intravenous formalin-ether, had completely recovered after 14 injections. Not heard from since.

The author appeals for further trial of the method. Details of other cases are not sufficient to warrant publication, but the treatment appears to have encouraging results—(*Abstract from original communication*)

## ON THE USE OF ADRENALIN IN WHITE ASPHYXIA OF THE NEWLY BORN

By CAPT. N. N. GHOSH, M.B.,  
Serajganj

THE author was in attendance on the confinement of a Mrs. A., a multipara. The child was born in white asphyxia, with the skin cold with no sign of respiration, but with the heart still beating. The usual remedies were tried,—dipping into hot water, clearing the throat and nose, Schultz's method of artificial respiration, and slapping the back. Finally continuous artificial respiration was begun, but the case appeared to be hopeless.

The author now gave an intra-cardiac injection of half a c.c. of liquor adrenalin, 1 in 1,000 (P. D. and Co.), the injection being given into the musculature of the left ventricle above the site of the apex-beat. Artificial respiration was continued. The heart beats immediately became quicker and more audible. Fifteen minutes later the child gave a gasp, and shortly afterwards began to breathe spontaneously. It was wrapped in cotton wool and carefully tended, but the next day

pneumonia set in, with a water-logged condition of the lungs, and death followed. It is doubtful whether this could in any measure be attributed to the use of adrenalin, as the delivery had occurred in the usual filthy surroundings of an Indian *busti*.

The author suggests that intra-cardiac injections of adrenalin may be worth trial in such cases, they cannot do harm, and may save the child's life. He further comments on a curious indigenous custom of frying the placenta on a frying pan, after its delivery, and whilst it is still attached to the child,—a custom which he has seen carried out in two cases. Apparently the popular idea is that in such cases,—if the frying placenta be kept at a lower level than that of the child,—heated blood may pass from it to the child and may stimulate respiration! (*Abstract from original communication*)

## SPECIAL ARTICLE.

### THE PROVISION OF WHOLE TIME DISTRICT HEALTH PERSONNEL IN THE UNITED PROVINCES

By C N DUNN, D.P.H.,

L.T.-COL., I.M.S.,

*Director of Public Health, United Provinces*

On taking over the appointment of Director of Public Health, United Provinces, I was struck with the inadequacy of the provisions made for improving rural sanitation and for dealing with the various epidemics which annually visit these Provinces.

After a careful enquiry into the matter, I came to the conclusion that the only epidemic disease against which anything like adequate provision had been made in the past is small-pox. For dealing with this disease a fairly adequate organisation has existed for some considerable time in the shape of the civil surgeons in their capacity of district superintendents of vaccination, the assistant district superintendents of vaccination and one vaccinator for each vaccination circle. The result of the provision of an adequate staff to deal with this disease has been that epidemics of small-pox are now few and far between, and no epidemic that has taken place in recent years has caused more deaths in one year than 1,439.

In the case of plague and cholera the contrast is striking. The average number of deaths occurring annually from plague during the last ten years has been 71,243 and from cholera 59,823.

With regard to malaria it is well known that, owing to the reporting agency being the village chowkidar, it has been practically impossible to arrive at even an approximate estimate of the numbers of deaths annually due to this disease. The death rate is grossly exaggerated and deaths from all kinds of acute and chronic respiratory diseases, with various intestinal complaints and other fevers are attributed to malaria. There is no doubt, however, that malaria, owing to its debilitating effects, is a predisposing cause to deaths from other diseases.

In the larger municipalities, medical officers of health and sanitary inspectors have been provided under rules laid down by the local government for some years, and these public health staffs have been able to reduce enormously the death rate from the above epidemic diseases. They have not been able to effect much improvement in the general death rate, as with the best will in the world, no medical officer of health can produce any effect on the general death rate of a town when money is lacking to spend on reconstruction in these towns, thus abolishing the extremely unhealthy housing conditions which now exist in the crowded mohallas of all Indian cities.

In the districts, statistics, such as they are, tend to prove that the general death rate, excluding the epidemic death rate, is much lower than in towns, as the inhabitants of the villages, although living in unhygienic surroundings from many points of view, are not exposed to the greatest of all the disadvantages

of living in towns in India, *i.e.*, gross overcrowding. It is therefore obvious that efforts to control epidemics in villages are certain to have a beneficial effect on the general death rate in rural areas.

Until quite recently the only organisation at the disposal of district authorities to deal with epidemics consisted of the civil surgeon and the vaccination staff, and they, under the control of the Director of Public Health and his Assistant Directors, did what they could to combat outbreaks of plague, cholera, etc. The district magistrate also gave all the assistance he could through the revenue establishment. With such an inadequate organisation working under many disadvantages, it is not surprising that very little amelioration in the prevailing conditions during epidemics has resulted. In many districts in the United Provinces, the civil surgeon is fully employed in the work of curing disease, in carrying out his duties as superintendent of the district jail and in medico-legal work, and in some districts this work is so heavy that the civil surgeon is debarred from touring in his district. The assistance rendered by the district magistrate and his revenue establishment varied according to the personal interest which that officer took in the suppression of epidemics. Some district officers applied their energies to this purpose with, in some cases, excellent results, while others, owing to the lack of personal interest and the multifarious nature of their other duties, obtained very poor results.

It therefore became obvious to me that the only method by which better results in dealing with epidemics could be obtained would be by the appointment of whole time personnel to deal with the prevention of disease, both endemic and epidemic. I proposed to government that qualified district medical officers of health with a minimum subordinate staff should be appointed to carry out these duties, thus relieving the civil surgeon of his duties as district sanitary officer and as district superintendent of vaccination, duties to which he was not able to devote anything like the necessary amount of time. I did not propose that such officers should be appointed in every district in the province at once, as it would be impossible to provide the necessary qualified personnel for all districts.

In order to provide this personnel gradually, I proposed that a beginning should be made by training medical officers of health and sanitary inspectors to fill the new appointments and obtained the sanction of government to the institution of classes at the Lucknow Medical College to train these officers.

Classes for a Diploma of Public Health to be conferred on doctors with a registrable qualification in the United Kingdom by the State Board of Medical Examinations were started. Classes were also started to confer a Licence in Public Health under the auspices of the same body on sub-assistant surgeons, whilst the number of sanitary inspectors being trained in the classes already in existence under government auspices was largely increased, in order to provide sanitary inspectors for district as well as for municipal work. These classes have now been in existence for three years and many candidates have qualified for the Public Health Service. The classes for the Diploma of Public Health were, after the first year, taken over by Lucknow University, who now confer this Diploma, the courses of instruction for which are in accordance with the new standard laid down by the General Medical Council in the United Kingdom, the course being one extending over 18 months. The standard for the Licence in Public Health is based on the old standard in force in England, the course being one of nine months' duration.

The courses for sanitary inspectors consist of two courses of four months each in the prevention of disease, sanitation and hygiene, and minor sanitary engineering, respectively.

These courses, therefore, provide the necessary qualified personnel for employment in public health work.

A scheme was then proposed to government for the appointment of district health staffs in three districts of these provinces as a beginning, the staff in each district proposed was one district medical officer of health with a Lucknow University Diploma of Public Health, one assistant medical officer of health with a Lucknow Licence in Public Health, and one sanitary inspector with a sanitary inspector's certificate for each tahsil in each district.

The districts chosen were Basti and Gorakpur, the Gorakpur district being considered to be equal to two districts for the purposes of this scheme, owing to its population being more than double the average population of a district. These districts were also chosen, as they are districts which are annually ravaged with severe epidemics of cholera and plague.

The health staffs in these districts were appointed in June 1922, and they have been, therefore, at work for nearly two years. The arrangement in these districts was that the District Boards should find half the salaries of this personnel and should, in addition, provide the necessary clerical and menial establishment from their own resources, together with other contingent expenses such as travelling allowance, carriage of tents, stationery, etc.

In April, 1923, the district of Azamgarh was added to the scheme, this being a large district south of Gorakpur, which is also annually ravaged by plague and cholera. In the case of Azamgarh, owing to financial stringency in the board, the whole cost of the scheme was promised by government for one year, in order to give the board a demonstration of its benefits to the general public health. In the case of Basti and Gorakpur after one year's experience of the working of the scheme, the district boards were asked by government to make the scheme permanent and to come to terms with government as to what proportion of the expense they were prepared to bear. As a result of this, a final arrangement has now been come to in these districts under which government are prepared to finance 2/3rds of the cost of the scheme, while the district boards are prepared to pay for 1/3rd.

At present the district boards are required to appoint qualified personnel only from the approved lists of each class of public health officers maintained in the office of the Director of Public Health and are required to pay this personnel the scale of pay laid down by government.

The scale for a district medical officer of health is the same as that for a second class municipality, viz Rs 350 per mensem, rising by biennial increments of Rs 50 to a maximum of Rs 700. For an assistant medical officer of health, the scale is the same as that laid down for a medical officer of health of a third class municipality, viz Rs 200 per mensem, rising by biennial increments of Rs 20 to Rs 400. For a sanitary inspector, the scale laid down for sanitary inspectors in municipalities, viz, Rs 70 per mensem, rising by annual increments of Rs 3 to Rs 100.

In addition to the above personnel, the whole of the vaccination staff is under the orders of the district medical officer of health, who is required to train the vaccinators in anti-epidemic duties, and use them for combating any epidemic which may arise. The qualifications required for newly appointed vaccinators are that they should have passed the VII Class examination, so that being literate, they can be adequately instructed in their duties.

In each district under the district health scheme, at least one provincial travelling dispensary is placed at the disposal of the district medical officer of health. In the above districts, being large, there are two in each. These public health travelling dispensaries are in the charge of sub-assistant surgeons who have taken the Licence in Public Health.

The above public health personnel is considered by me the absolute minimum from which we may expect results in any way commensurate with the expenditure. It is not considered a sufficient personnel, but it is

hoped that district boards will be so impressed with the benefits accruing to the health of the community, that they will be willing in the future to gradually increase the staff and thus obtain further far-reaching benefits from their employment.

The duties of a district medical officer of health are as follows —

1 The district medical officer of health will be in charge of the public health of the district or sub-district to which posted, excluding municipalities which have a municipal medical officer of health, and cantonments. He will be under the general control of the Director of Public Health and under the immediate direction and orders of the district board. He will tour in the district, inspecting and supervising the work of the assistant medical officer of health and the sanitary inspectors under him. He should freely confer with the chairman of the district board on the various subjects connected with his work in order to keep him in touch with the matters of importance.

## 2 Sanitation

When inspecting the sanitation of town areas, notified areas and villages, he should examine each aspect of the public health conditions mentioned below and make recommendations to the district board with care and fore-thought.

- (1) Site
- (2) (a) Surface cleanliness
- (b) Collection and disposal of rubbish and night-soil
- (3) Drainage and drainage outfall (with the possibility of a sewage farm)
- (4) Water supply
- (5) (a) Sub-soil water level and direction of flow
- (b) Pools and depressions within the area and half a mile radius of inhabited area
- (c) Character of crops grown in this area whether by irrigation, by gravity or by lift.
- (d) Varieties of anopheles larvæ and fish found
- (6) Markets, bazaars, slaughter houses and food supply
- (7) Housing in relation to rats and plague, overcrowding
- (8) Any other interesting feature bearing upon sanitation
- (9) Income and expenditure with special reference to expenditure on sanitation

## 3 Inspection of vaccination

He should exercise a close personal supervision of vaccination in his district. This is very necessary, as vaccinators, unless closely supervised, resort to many devices to show large returns on paper and do little work. This results in an increasingly large unvaccinated population growing up, which will inevitably result in a return of the scourge of small-pox in epidemic form. The inspection of vaccination in villages and hamlets away from main roads should receive special attention.

When checking vaccinators' returns for the discovery of fictitious entries, strict enquiries should be made from the *mukhtas* and *dhais* whether the name of the absentee is known in the village, and if known, whether a child of the age reported was really born in the family during the period under report.

## 4 Inspection of registration of births and deaths and collection of vital statistics

This is notoriously defective, and, therefore, requires constant checking in order to materially reduce errors in reporting. In reporting errors found in birth and death registers, the details of place, name, father's name, caste, date, etc., should be given.

## 5 Inspection of schools, especially middle and primary schools

In inspecting schools he should devote attention to the sanitation of the building and the site and also inspect the scholars and make recommendations to the educational authorities for improving their health.

#### 6 Religious gatherings and fairs

The supervision of the sanitation and health of all religious gatherings and fairs in the district are an important part of his duties

7 Supervision and constant inspection of all the travelling dispensaries

#### 8 Hygiene publicity propaganda

He should direct and control the propaganda with a view to gradually educating the people as a whole to understand the value of personal and communal hygiene, and to acquaint them with the simple rules for avoiding epidemic and endemic diseases. He should personally give lectures in towns and villages to all classes of the community illustrated by magic lanterns and slides provided by the Provincial Hygiene Bureau. He should distribute the posters and pamphlets published by the bureau on the subjects dealt with under its organisation

This is one of the most important portions of his duty, as no permanent advance in the prevention of the disease in rural areas can be expected unless a demand for better hygienic conditions is created by the people

#### 9 Epidemics

His most important duty of all is to organise campaigns against the great epidemic diseases, especially cholera and plague. It is only by the provision of an expert organisation to deal with these diseases that a permanent diminution in their ravages may be expected.

From the three districts in which the scheme has been introduced, reports on the work done have been received and in each the work has, in my opinion and in that of the Assistant Director of Public Health, IV Range, been conscientiously carried out. In all three districts several primary outbreaks of cholera have occurred, but owing to the prompt action by the district health staffs, in no single case has a general epidemic supervened. This is a great contrast to what occurred in previous years, when owing to faulty notice of primary outbreaks and the lateness of the action taken by the district authorities, severe epidemics of cholera have occurred annually. The average numbers of deaths from cholera during the five years, previous to the introduction of the scheme, were as follows—

Gorakpur	9,731.2
Basti	5,634.6
Azamgarh	2,963.2

While the numbers of deaths from cholera in the year following the introduction of the scheme are as follows—

Gorakpur	56
Basti	27
Azamgarh	112

In the case of plague the figures for the same periods are as follows—

Gorakpur	7,166.6 and 9,515
Basti	4,658.4 " 9,883
Azamgarh	7,654.2 " 4,464

The same diminution in the number of deaths from plague was not expected as in the case of cholera, owing to the great difficulty in getting the people to carry out the measures for escaping from this disease. Also there has been a general recrudescence of plague in the United Provinces during the last two seasons after a long period of mild epidemics. However, the district health staffs applied themselves strenuously to obtaining the evacuation of infected villages and a large number of inoculations were carried out with the result that epidemics of this disease were greatly limited.

With regard to small-pox, a few isolated epidemics occurred which were controlled, and large numbers of vaccinations were inspected by the district health staffs.

With regard to malaria, owing to the activities of the district health staffs, much anti-malarial work was done, and villages and landowners were, in many cases, induced to carry out small anti-malarial measures without any expense to the district boards whatever.

**General Sanitation**—The sanitation of all notified areas, town areas, and villages under the Village Sanitation Act, was inspected with the result among others that the water supply from wells was in general much improved.

In the Gorakpur and Basti districts during the year ending 31st March, 1923, 1,477 and 419 villages, respectively, were visited in connection with the Hygiene Publicity Campaign.

**School Inspection**—In the Gorakpur and Basti districts 185 and 30 schools were inspected, and all scholars were examined for contagious and infectious diseases. A large number of cases of trachoma and ring-worm were detected and suitable treatment recommended.

The district medical officers of health of these districts have submitted lengthy and detailed reports of their work since their appointments, and from a careful perusal of these reports it appears that much amelioration in the existing conditions has resulted, the total death rates have been largely reduced, as has also the infantile mortality, the malaria death rate and especially the cholera death rate. In all districts the number of inoculations against plague has been doubled or trebled, the numbers of inspections of vaccination have been largely increased and the numbers of inspections of vital statistics are also far more than in any previous years.

Owing to financial stringency, the extension of the scheme to other districts has been retarded, but it is hoped that it will be possible to extend the scheme to four more districts in the near future.

I consider that the success of the scheme is due to the fact that the public health personnel appointed are qualified officers who have taken up public health as a career, and who are, therefore, personally interested in the results obtained from their work. In the past, temporary assistant surgeons and sub-assistant surgeons who were employed on anti-epidemic duty had but little interest in their work owing to the absence of any prospects as the result thereof, and whose chief ambition was to get an appointment in the medical department as medical officer in charge of a dispensary. It is therefore to be hoped that there will be no reversion to the system which loaded the civil surgeon with a large amount of work which he had neither the time nor as a rule the training to carry out, but that each district in time will be provided with a qualified and energetic staff of public health officers whose prospects will depend entirely on their own efforts to prove their value to the community.

With regard to cost, the following figures may be of interest—

(a) *Gorakpur District (Six tahsils)*—Two district medical officers of health, with a staff of two assistant district medical officers, five sanitary inspectors, two clerks, four peons, travelling allowances and contingencies—Rs 27,708 per annum.

(b) *Basti District (Five tahsils)*—One district medical officer of health, with a staff of one assistant district medical officer, three sanitary inspectors, one clerk and three peons, with travelling allowances, contingencies, etc—Rs 18,000 per annum.

(c) *Azamgarh District (Six tahsils)*—One district medical officer of health, with a staff of one assistant district medical officer, six sanitary inspectors, one clerk, two peons, with travelling allowances, contingencies, etc—Rs 17,514 per annum.

## Current Topics.

### The Care and Treatment of Sick Lascars in London.

WITH a fine appreciation of the value to the Empire of the work done by lascars on board the great steamers

which link India with England, Mr Singhanee of Poona has, from his fortune, devoted a lakh of rupees for the care of lascars who may fall ill when in the Port of London. This money is being administered by the Seamen's Hospital Society which has thereby been enabled to erect and equip at their hospital at Tilbury Docks a new wing to be used exclusively for the care and treatment of sick lascars. In a strange land, whose climate is unsuited to their physical nature this ward will be to unfortunate lascars a haven of refuge at a time when they most need consolation.

In addition to the above mentioned hospital at Tilbury the Seamen's Hospital Society administers three other hospitals in the metropolis, a sanatorium for tubercular diseases in Hampshire and a convalescent home on the Kentish downs. The mother institution the "Dreadnought" Hospital Greenwich has accommodation for 235 patients. In the past 8 years a substantial sum has been collected which in the immediate future is to provide a new nurses' home and other extensions which will bring this building into the front rank in the matter of up to date equipment. From here a motor ambulance is sent to fetch from his ship any seaman seriously ill the moment she comes along side the quay.

In the centre of the Victoria and the Albert Docks, there is a small hospital of fifty beds which, owing to its position, is of immense value in admitting patients who are dangerously ill when their ship comes to the docks.

At the Hospital for Tropical Diseases in Endsleigh Gardens maladies of this special nature receive expert treatment at the hands of physicians who have specialised in tropical medicine. In the same building is the London School of Tropical Medicine which is affiliated to the Seamen's Hospital Society. The work of this School in London and the research expeditions sent under its auspices to many tropical districts is well known to all doctors and students of tropical medicine.

Phthisis is a disease which attacks the lascars of India with particular persistence and the King George's Sanatorium for Sailors at Bramshott Place on the summit of the Hindhead hills is an ideal place in which to pursue to long treatment which the cure of this disease demands.

The sea is no respecter of persons and disease and accidents are common incidents in a seafaring life. It is therefore hoped that those who sympathise with the white man who works side by side with the lascar on the Indian routes will come forward in an equally generous spirit to that displayed by Mr Singhanee and help the Seamen's Hospital Society to give the very best medical and surgical aid to all mariners in affliction.

The Seamen's Hospital Society is honoured by the confidence which Mr Singhanee has shewn in the Corporation by allowing them to administer his munificent gift.

Every seaman—of whatsoever race or nationality—who comes to the Port of London suffering from any serious disease, falls under the care of this Society. The more extended this confidence, an expression of which takes the form of donations to the funds of the Corporation the greater the effort made to deserve the trust placed in the Society.

### The "Field" Distemper Fund

MEDICAL men interested in the diseases due to filtrable viruses will welcome the inauguration of organised effort in England to solve the mysterious problems of canine distemper, a disease perhaps even more prevalent in India than in England. The solution of such problems may throw a flood of light on several human diseases, apart from its humanitarian and veterinary value.

The Fund has already reached the total of £4257, and its administration is in the hands of a very

strong council which includes such eminent statesmen as Lord Goschen and such eminent research workers as Sir W. Leishman, MRS and Professor C. J. Martin. Work has already been started in earnest, and the following extracts from the first research report by Sir William Leishman will interest many of our readers.

"The Research Committee have been actively engaged in making preparations for new scientific studies of this disease, its causation and the possibilities of its cure or prevention. Their work up to this stage has been under the following heads:

1 *Survey of Existing Knowledge and the Scientific Methods Hitherto Employed*—In the past 50 years many workers in different countries have studied the subject, and their published work has been critically examined by the Committee. Omitting here all details of this it may be said that many good observers have described a bacillus, easily visible under the microscope as commonly found in distempered dogs and have looked on it as the cause of the disease. Others, again, have regarded the bacilli so found as secondary invaders, because perhaps of many of the complications and sequelæ, or possibly of the fatality of the disease but the primary infection they consider to be due to some hitherto unrecognised agent. Thus Carre believes that his experimental results definitely show that the disease is caused by an invisible virus so small as to be able to pass through a porcelain filter.

Carre carried out a number of experiments in which young puppies were employed. He found that if the nasal secretion of an animal in the early stages of distemper was diluted, filtered through porcelain so as to free it from all ordinary bacteria, and then injected subcutaneously in sufficient quantity, the disease was constantly reproduced and could be transmitted through a long series of animals. The dogs infected with filtered nasal secretion showed all the characteristic symptoms of the various forms of the disease. He further found that these animals if they recovered, were immune against further attacks. He found that the blood was infective only in the very early stages—in fact just after the onset of fever, that is to say, at a time when it is free from ordinary bacteria. These experiments were repeated on several occasions and gave quite constant results. They were considered by Carre, however, to be only preliminary to further work.

The reasons that have led most veterinary surgeons and pathologists to favour the views formulated by Carre, rather than those held by Ferry, Copeman, McGowan and others, namely, that the disease is due to a bacillus may be summed up as follows—

(i) Most investigators have been unable to reproduce the complete clinical picture of the disease by means of these bacilli.

(ii) The employment of vaccines made from the recognisable bacilli have proved of little use in protecting dogs against attacks of the disease.

That an organism is found in a very large percentage of the cases is no absolute proof that it is the casual agent of a disease, for it has long been recognised that a particular bacillus may be a regular though accidental complication of a specific fever.

2 *Visits to Foreign Centres of Research*—Three members of the Committee, Professor Hobbay, Mr Buxton and Capt. Douglas have visited Antwerp, Rotterdam, Utrecht, Brussels and Paris, and at Paris had the advantage of full discussion with Messieurs Carré and Vallée at Alfort.

The workers of these countries are, in general, inclined to the view that the bacilli are complicating and secondary organisms, while the true cause of the disease is a filtrable and invisible virus.

3 *Proposed Scheme of Investigations*—On consideration of the work of previous investigators, it seems evident that the research now proposed should be begun almost *de novo*, and that the value of the earlier experimental findings should be re-examined.

The preliminary material for the purpose will be supplied by specially reared puppies which have been permitted to contract distemper by contact with dogs suffering from a natural infection. An attempt will be made to isolate from these animals organisms such as those which have been already described by earlier workers and the invisible virus recorded by Carre. The significance as causes of the disease of any organisms so obtained will be determined by experimental methods on specially reared susceptible puppies.

Carre's experiments consisted principally in the subcutaneous injection into susceptible puppies of bacteria-free filtrates of various secretions, etc., obtained from dogs suffering from distemper, and the careful observation of the experimental animal for any early symptoms which might denote the presence of the disease before the secondary and more obvious symptoms were manifest.

In the event of the presence of a filter-passing virus, such as that obtained by Carre, being established, a whole new field of research is immediately opened up. Briefly this may be summarised as follows—

(a) The research for the virus by modern optical methods

(b) The determination of its resistance to temperature, light, moisture, antiseptics, etc

(c) Attempts to cultivate the virus artificially

(d) The study of immunity, natural and acquired, in animals

(e) The study of complications and sequelæ of distemper, their cause, and their preventive treatment

Whatever may be the ultimate success in discovering and defining the essential cause of distemper, it is certain that much useful knowledge will be acquired about the propagation and method of spread of the disease, and a very serious attempt will be made by the investigators to discover more satisfactory methods for the prevention and control of canine distemper.

4 *Particular Methods Proposed*—It is evident that the proper study of the ætiology of canine distemper can only be undertaken by employing animals in which the disease occurs under natural conditions—namely, dogs. Further, the dogs must be susceptible to infection, and the chance of the animals becoming spontaneously infected must be eliminated. As was pointed out by Ferry, previous workers did not appear to have mentioned the adoption of any special precautions in the protection of their experimental animals from accidental infection before their inoculations or during subsequent treatment. The vast majority of young dogs are susceptible to the disease, but if the animals are purchased or bred in the ordinary manner there is always the possibility that some may have contracted a mild form of the disease unnoticed, and may thus have developed an unsuspected immunity. The presence of even a few such animals in an experimental stock would make the investigation inconclusive, and therefore useless. The precautions adopted by Ferry, although apparently very much in advance of those of previous workers, leave much to be desired.

The breeding of suitable puppies is regarded as the most important preliminary step in the investigation. For this purpose it is proposed to build a compound in an isolated spot on the experimental farm of the Medical Research Council.

In order that there may be no delay, it is proposed to carry out preliminary experiments, during the time occupied by the erection of these buildings and the breeding of the special stock, in temporary structures which are now rapidly nearing completion. In the first instance puppies will be used which will have been bred and reared in a manner similar to that adopted by Ferry. Healthy pregnant bitches will be purchased, and after a suitable period of observation will be placed in a special breeding room. The puppies will be taken away as soon as weaned, suitably cleaned and passed through a series of observation rooms. Animals so reared will be used for the preliminary investigations, but for the principal experiments greater

care will be taken to ensure their entire freedom from an acquired immunity.

5 *Supplementary Schemes of Research or Inquiry*—While the Research Committee are planning centralised research work of the kind just indicated they have under careful consideration all the numerous proposals for work at other places and offers of scientific help which have come from many sources. They hope to avail themselves freely of these at the right time and as opportunities occur. Under this head may be mentioned the collection of data of the incidence in time and locality of distemper outbreaks, for which the Committee may soon ask special assistance.

It will be seen in the above report that a well planned campaign is ahead, and that it may yield results of considerable medical as well as of veterinary value.

The Council and the editor of *The Field*, further appeal to dog-lovers the world over for financial assistance. The address of the Fund is Windsor House, Bream's Buildings, London, E C 4.

### The Control of Malaria.

By MALCOLM WATSON, M D (Klang), F M S

*Jour Trop Med and Hygiene*, Jan 1, 1924, p 6

BEFORE Sir Ronald Ross's epoch-making discovery malaria was, and had been for hundreds of years, a dark inscrutable mystery. Ross's genius changed darkness to light. Dr Watson briefly gives two instances of what has been done in the Malay Peninsula in the past twenty years under different physical conditions, the places are within three degrees of the Equator, have a rainfall round about 100 inches a year spread throughout the year, and the country as a whole is naturally covered by an ever-green damp jungle, whilst mosquitoes exist in myriads at all times. One example is of malaria on low-lying land, the other of malaria on hill land.

Twenty years ago or less, if the tropical sanitarian had been asked what was the class of land least likely ever to be freed from malarial by the control of mosquitoes (or any other means for that matter) he would unhesitatingly have named the low-lying coastal land with high ground water, heavy clay soil, liable to flooding from the sea. Such land had ever been known to be pestilential almost beyond description, it had given rise to innumerable speculations on the cause of malaria—the decay of coral, the mixing of fresh and salt water, to name but two. In every part of the tropical world instances of the deadly power of malaria in coastal regions could be given. In the Malay Peninsula and Archipelago, for example, the Governor, Sir Frank Swettenham, in 1901 ordered the new port called after himself to be closed, so overpowering was the malaria. On the opposite side of the Straits of Malacca, the Port of Belawan in Sumatra was so malarial that the Dutch left it every night, retired to a town some twenty miles inland, to return by the first train the following morning. Many other examples could be given.

Carey Island is situated on the coastal belt of such land. It is indeed an island just above sea-level in its highest parts, and obviously has been formed by the alluvium from the hills. Surrounded by water, on one side by the sea, on others by large rivers or riverine estuaries, containing salt water, it was fringed by mangrove swamps and covered by dense virgin jungle. Throughout its length and breadth it was swamp, either of fresh water or salt.

In 1906, a pioneer planter of Malaya, the late Mr E V Carey, took up a concession of 30,000 acres on the island and began the planting of rubber and coconuts. The land was banded and drained. Tide gates were necessary. Enough was known of the control of malaria to enable the labour to be kept free from malaria from the first, and opening rapidly proceeded. To-day some 14,000 acres (or roughly 20 square miles) are under cultivation. No European—of a population of from twenty to thirty—has contracted malaria on



the island since 1912. In 1922, the average Asiatic population was 4,344. There were twenty-six cases of malaria, fourteen clinical cases, and twelve in which parasites were found. This is a rate of six per mille. The lowest rate recorded in Panama was fourteen per mille.

The death-rate of the labour force in 1922 was 8.2 per mille. This freedom from malaria has been achieved by good drainage and by the selection of suitable sites for buildings. It costs the estate practically nothing, while the absence of malaria makes the estate one of the cheapest producers of both rubber and coconuts in the East. This is an example of the control of malaria carried by two species of anophelids—namely, *Anopheles umbrosus* and *A. ludlowi*.

Even in small rural areas malaria has been controlled at a cost well within the reach of a commercial undertaking, indeed, the money spent has been recovered within a short period by the improved labour and a lowered cost of production.

*The City of Singapore*—Following the control of malaria in the coastal regions, a new and apparently even more difficult problem confronted Dr. Watson—namely, malaria on hill land. In the ravines or valleys, when under jungle, malaria was carried by *A. umbrosus*, when the jungle was swept away, when, for stagnant swamps in the valleys, swift clean running streams were substituted, malaria was of even greater intensity, in many places death claiming over 300 out of every 1,000 of the population per annum. The mosquito carrier which lived in these streams was *A. maculatus*.

Excellent work has been done in the city of Singapore. Prior to 1911 a malaria wave swept over the city almost every year. It generally reached its maximum in the month of May. In 1911 Dr. Watson was asked to advise the Anti-malaria Committee, and drew up plans for the control of malaria in a selected area.

Indeed Singapore has now ceased to be malarial, as far as the troops are concerned. The area under mosquito control is almost six square miles. There are 8½ miles of concrete channels and 31 miles of subsoil drainage. A sum of approximately £350,000 (say £38,000 sterling) has been spent on capital and maintenance accounts. This year there is a vote of \$100,000 (say £12,000) for maintenance and extension of anti-malarial and general anti-mosquito work.

Following the anti-malaria work, the spleen rate of the children fell progressively from about 50 to zero.

Per 1,000

The peak of the malarial wave in May averaged for the ten years 1903 to 1912	53.76
The peak of the malarial wave in May averaged for the ten years 1913 to 1922	33.73

A reduction of	16.49
The average annual death-rate from all causes was for the ten years 1903 to 1922	44.11
The average annual death-rate from all causes was for the ten years 1913 to 1922	33.73

A reduction of	10.38
The average population 1913 to 1922 was	312,763
The saving of life is therefore	32,214

The saving of life is from all medical and sanitary measures, but the most important of these measures is the control of mosquitoes.

Finally, Dr. Watson adds that in the 25 years since Sir Ronald Ross's discovery, over 100,000 lives have been saved in Malaya alone, owing to that discovery, and the work is just beginning.

## Sprue and Coeliac Disease

*Brit Med Jour* Dec 15, 1923, pp 1150

At a meeting of the Sections of Tropical Diseases and Parasitology of the Royal Society of Medicine on December 3rd a discussion took place on sprue and coeliac disease.

Sir Leonard Rogers in opening, said that a large number of theories with regard to any particular disease indicated that we were ignorant of its real nature, that was especially true with regard to the causation of sprue—a group of symptoms which might be produced by several aetiological factors, the essential factor being still unknown. The various theories might be divided into two groups, those suggesting digestive changes and the infective theories. Of the latter the most important was that which ascribed sprue to the action of the yeast group of fungi. *Monilia pilosus* had also been suggested. It was probable, however, that yeast fungi were merely an aggravating secondary infection. Organisms of the group *Streptococcus viridans* had been identified and good results had been obtained from the use of oral streptococcal vaccines. The great loss of colour in the stools lent weight to the theory of digestive deficiency, there being an excess of fat in the stools. In order to discover the originating factor of the disease it was necessary to study the early stages. Sir Patrick Manson had stated twenty predisposing causes, from long endemic residence to fistula and miscarriages. Hill-diarrhoea in India was a very important predisposing cause which threw great light on the subject as the digestive changes in that disease had a suggestive similarity to sprue, and neglected hill-diarrhoea very often developed into sprue. Hill-diarrhoea was not infective, and would immediately cease upon removing the patient to a lower level. There was strong evidence for the belief that deficiency in vitamins was a predisposing cause of sprue, a diet of tomatoes and marmite giving good results, although marmite was an extract of yeast, the very fungus which was supposed to cause sprue. Vaccines had been used with a certain measure of success. Extraordinarily rapid recoveries had resulted from treatment on the theory of calcium deficiency.

Dr. A. Castellani said that infections by monilia and streptococcus were secondary. He had never had the slightest result from the use of monilia vaccines. He did not agree with the theory that sprue originated in syphilis. He had never found salvarsan treatment successful, alkaline treatment was certainly useful.

Dr. H. H. Scott read a paper on the nature and treatment of sprue, by parathyroid extract and calcium lactate, previously reviewed in our columns.

Dr. Arthur Powell emphasized the differences between coeliac disease and sprue. In sprue *post-mortem* examination invariably revealed a shrinkage of the liver, great attenuation of the stomach, with loss of epithelium, these conditions were not observed in coeliac disease, which was characterized by enlarged spleen and great pain in the abdomen. Vomiting was more frequent in coeliac disease than sprue. In coeliac disease the appetite was poor and capricious whereas, unfortunately, in sprue it was the opposite. There was a tendency to dropsy in coeliac disease, while there was shrinkage of the body in sprue. In sprue he had known the pancreas to show the symptoms of syphilis.

Dr. Low said he had known cases of sprue—if it were sprue—in which the disease had developed ten years after the patient had returned to England. The curing of the septic condition of the mouth had been extremely beneficial, although he believed the effect was secondary. It was extremely difficult to know when a permanent cure had been effected.

Sir Leonard Rogers, in summing up, said that he thought sprue might be due to the fact that vitamins were not properly digested, and not to any lack in the diet.

### Kangri-Burn Cancer

By ERNEST F NEVE, M.D., C.M., F.R.C.S. (Edin.),  
Surgeon, Mission Hospital, Kashmir

*Brit Med Jour*, Dec. 29, 1923, pp 1255

THE following extracts from Dr Neve's paper will be of interest —

Since the year 1881, operations for epithelioma performed in the Kashmir Mission Hospital have numbered 2,491, of these approximately 2,000, or 84 per cent, were for kangri cancer. The kangri is an earthenware bowl five or six inches in diameter, surrounded by basket-work and surmounted by a wicker handle. It is heated by means of wood-charcoal, and is worn, by the poorer class of Kashmiris against the skin, under a single loose garment not unlike a smock-frock. The primary factor in the causation of kangri cancer is, doubtless, heat, but it is possible that the volatile substances resulting from the combustion of the wood play a secondary part. The seats of election of the growths are the inner sides of the thighs and the anterior surface of the abdomen above or below the umbilicus. The disease is considerably commoner in men than in women, probably owing to the less continuous use of the kangri by the latter in their mostly domestic occupations. The average age for the onset of the cancer is 55 in a few cases it occurred before the age of 40 and in 7 per cent of the cases over the age of 70. Many elderly Kashmiris show a great tendency to localized superficial overgrowth of the epithelium, small, slightly scaly, pigmented patches or papules may be found scattered over the entire surface of the body. Owing to the constant application of heat the skin of the thighs and abdomen often appears dry and horny, the course of the superficial veins is marked out by a brown discolouration, and every degree of chronic dermatitis may be met with, from a mere redness, with or without desquamation, to thickened patches, warty projections, or horny outgrowths from the surface. Scars, resulting from previous kangri burns, are frequent, and are apt to undergo a malignant change.

Kangri-burn cancer is never found on the back or on the extensor surface of the limbs. It may be single or multiple, and the skin around it usually shows scarring. In the early stages ulceration is absent, and the growth consists of a mere horny or warty thickening, beneath which an epithelial infiltration is demonstrable microscopically. The cancer is met with in three forms, the commonest of which consists of a circular or oval ulcer about an inch and a half in diameter, with deep crater-like centre and raised edges. In some cases part of the tumour is fungating and the rest deeply excavated.

The average duration of life in kangri-burn cancer is about fifteen months, in about 10 per cent of the cases, from one to five years, and, as an exceptional event, as long as twenty years. The malignancy varies. As a rule a small growth, if superficial, is slow to grow and still slower in infecting the glands. There are, however, striking exceptions, and at times a slowly growing tumour will suddenly show a rapid increase. More than 50 per cent of the cases show secondary infection of the glands when first seen.

[We hope shortly to publish an illustrated article by Dr Neve on this important subject—Ed, *Indian Medical Gazette*]

## Reviews.

**THE ANATOMY AND PHYSIOLOGY OF THE MALE BODY.** By Hubert E. J. Biss, M.A., M.D., Cantab., D.P.H. Plates by M. Dupuy, M.D. Third Edition. London: Baillière, Tindall and Cox, 1924. Pp. 27. Price, 6s. net. Plates 8.

THIS popular atlas of the human body will be useful to junior medical students, and also to those members

of the lay public who are interested in physical culture, hygiene and artistic anatomy. The plates are well produced.

**GERIATRICS.** By M. W. Thewlis, M.D. 2nd Edition. Pp. 401. Price, \$4.50. St. Louis: C. V. Mosby Co. 1924.

IN most respects, the old command a degree of attention which is out of proportion to their value to society and so it is rather surprising that there should be many books on pediatrics and hardly any on geriatrics.

We venture to assert that the majority of medical men do not know the meaning of the word geriatrics and perhaps the author would have been well advised to give his book a more familiar name. The need for a book on the special aspects of disease in the old is obvious. Dr Thewlis is one of the few physicians who has made a thorough study of the subject and he has made a serious effort to place geriatrics on as sound a basis as pediatrics.

Old age, like most diseases, is more easy to prevent than to cure, and this aspect of the subject is fully dealt with in the book under review.

**INFLAMMATION IN BONES AND JOINTS.** By Leonard W. Ely, M.D., Associate Professor of Surgery, Stanford University, Philadelphia and London: J. B. Lippincott Co. Obtainable in India from Messrs. Butterworth & Co. (India), Ltd., P. O. Box 251, Calcutta. Pp. 433, with 144 illustrations. Price, 30s. net.

THIS book is not an exhaustive treatise on the diseases of bones and joints, in fact it contains little that is not to be found in any of the moderate sized works on surgery which are in common use amongst students. The chapters on diseases of the bones are decidedly sketchy and we find no adequate description of the microscopical anatomy of inflammatory changes in bone, acute or chronic, though there is an abundance of micro-photographs which, excellent though they are in their way, never convey as clear an impression to a student as a well executed drawing. The chapters on the joints are more satisfactory, the clinical descriptions are good and the methods of treatment adequately dealt with, though the author's views on the treatment of spinal tuberculosis indicate a faith in the efficacy of Albee's and Hibb's operations which is not shared by all orthopædic surgeons. The trend of modern surgical opinion is in favour of restricting these operations to adult cases and only employing them in children, when for some reason conservative treatment is not practicable, many of the reported "successes" in America have had subsequently to be classed as "relapses".

In the chapter on rickets a brief reference is made to an "error in diet," but there is no account of the work of Chick, Mellanby and others on the nature of this "error." Transtrochanteric osteotomy of the femur is an admirable operation, which surely deserves mention along with linear osteotomy of the neck and cuneiform subtrochanteric osteotomy.

The division of arthritis into two great types, one type being osteo-arthritis with new bone formation and the other including all other varieties of chronic arthritis, is ingenious, but does not appear to serve any particularly useful purpose. In a footnote the author records the finding of *Entamoeba histolytica* in the bone marrow of a case of osteo-arthritis and expresses a hope of thus clearing up the mystery of this disease. The book is well printed and illustrated.

**THE AMBULATORY TREATMENT OF FRACTURES AND DISEASED JOINTS.** By Carel A. Hoefftcke. With an introduction by Frank Romer, M.R.C.S. London: William Heinemann, 1923. Pp. 273, with 261 illustrations. Price, 17s. 6d. net.

THIS is not a book by a medical man, but by a maker of a pattern of splint which is a modification of



Hessing's Our readers will no doubt be familiar with the appliance from the advertisements which have for long appeared in the medical journals. The apparatus works on the same principle as the Thomas' caliper splint, which allows of walking by carrying the weight of the body on the tuber ischi. In addition there is an arrangement for applying extension by means of an accurately fitting ankle. The introductory chapters deal with the principles on which the splint depends and furnish descriptions of its construction and application. Following these come a series of extracts from papers in medical journals, personal letters from surgeons and practitioners, some distinguished, some undistinguished, and a mass of records of successful cases arranged on no systematic plan and unaccompanied by any statistical tables of results.

For the treatment of ununited fractures and for the post-operative treatment of certain fractures, the principles on which this splint depends are universally accepted. So too in osteo-arthritis it is now recognised that movement and correction of deformity by surgical means is an essential part of the treatment. When it comes however to forcible correction of the deformity in acute joint tuberculosis, we are on more debatable ground. The author corrects deformity at one sitting on an ingenious extension table of his own invention, puts the limb up in plaster and then fits his apparatus with extension, claiming that the separation of the joint surfaces allows use of the joint without pain. From his case records it would appear that most of his cases are of a chronic type. The majority of the most experienced orthopedic surgeons are opposed to ambulatory treatment in acute cases though we must not forget the success of Willem's ambulatory treatment of acute suppurative arthritis also on lines opposed to all authority. The reader must choose for himself the method should be thoroughly tried, but it is hampered by the expense of the apparatus which puts it out of reach of all but wealthy patients.

It remains to add that Mr Hoeffcke has worked always with the medical profession and is not one of these who claim to offer an alternative form of treatment.

**LECTURES ON ENDOCRINOLOGY.** By Walter Timme, M.D. New York: Paul B. Hoeber. Pp. 123. Price, \$1.50.

This little booklet is an unchanged reprint of an article which appeared in the *Neurological Bulletin* for January, 1921. It gives in a condensed form a good idea of the functions of the endocrine glands.

**HANDBOOK OF PHARMACOLOGY INCLUDING MATERIA MEDICA.** By Birendra Nath Ghosh, F.R.F.P.S. (Glas.) First Edition. Calcutta: Hilton and Co., 1923. Pp. 396. Price, Rs. 4.

DR B. N. GHOSH who is well known in this country as the joint editor of Rakhal Das Ghosh's "Materia Medica," has brought out a small handbook of pharmacology including materia medica, which has been sent to us for review. The author says in the preface that the volume is intended for students studying for different licentiate diplomas and therefore all unnecessary detail has been left out. The arrangement followed is in the main that of Ghosh's "Materia Medica," though the classification of drugs is somewhat different. Preliminary reference to the physiology of the organs on which the drug produces its actions will undoubtedly help the student to a better understanding of the pharmacological action of the drugs. The descriptions of the actions of remedies are necessarily concise but they are none the less accurate and lucid and there is hardly any important point which has been omitted. The book, one has no doubt, will prove to be of very great assistance to students preparing for examinations.

**MATERIA MEDICA, PHARMACY, PHARMACOLOGY AND THERAPEUTICS** by William Hale-White, K.B.E., M.D. (Lond.), M.D. (Dub.), Hon. Col., R.A.M.C. (T) 18th Edition J & A Churchill, 1924. Pp. 712. Price, 10s. 6d. net.

THE *Text-Book of Materia Medica* by Sir W. Hale-White is one of the best known well established and standard books on the subject. The eighteenth edition which has just been sent to us for review has several useful additions and alterations which brings the book quite up to date. We cordially welcome the new edition of this popular book which we are sure will be appreciated by students and practitioners.

**A TEXT-BOOK OF THERAPEUTICS, INCLUDING THE ESSENTIALS OF PHARMACOLOGY AND MATERIA MEDICA.** By A. A. Stevens, A.M., M.D. 6th Edition. Philadelphia and London: W. B. Saunders Co., 1923. Pp. 793. Price, 30s. net.

THE sixth edition of this well known book has been entirely revised, enlarged and rearranged and is a great improvement on the fifth edition which appeared in 1916. The author's arrangement of dealing with the pharmacological action of the remedies first and then going on to their application in the treatment of disease is very helpful. Owing to the limited space at the author's disposal and the large ground which has been covered, some of the descriptions of the actions of drugs have been necessarily brief, even in case of some of the important drugs. But the book on the whole is excellent from the practitioner's point of view, who does not desire to go too deeply into the experimental side. The part dealing with applied therapeutics could not be better. This book is not very well known in this country and we wish to bring it to the notice of senior students and practitioners who cannot have a better reference book.

**TAYLOR'S SANITARY INSPECTOR'S HANDBOOK.** 6th Edition. Edited by John H. Clarke. London: H. K. Lewis & Co., Ltd., 1924. Pp. 540 + xii. 116 illustrations. Price, 12s. 6d. net.

THIS is a new edition of a well known text-book, largely rewritten by J. H. Clarke M.R.S.I., Chief Sanitary Inspector, Chiswick. The book is much improved and has many new illustrations. It is a very necessary *vade mecum* for Sanitary Inspectors in England for whom it is specially written. Local conditions and public health law in the tropics differ so greatly from those of England that the book has but a relative value for the health officer or student in India.

**CLINICAL DIAGNOSIS BY LABORATORY METHODS.** By J. C. Todd, M.D., Professor of Clinical Pathology, School of Medicine, University of Colorado. 5th, 1923, Edition. Philadelphia and London: W. B. Saunders Co. Pp. 762, with 325 illustrations. Price, 28s. net.

Todd's *Clinical Diagnosis* is or should be, well known to laboratory workers, for it is an admirable book, well printed, profusely and beautifully illustrated, and most ably written. In the fifth edition the work has been entirely revised and much of it re-written. Special attention has been given to errors in technique and faulty manipulations of the microscope,—causes which are more responsible than any others for the difficulties and mistakes of students. In the new edition the additional matter includes the examination of the duodenal contents, the tests for acidosis, and the most recent methods of blood chemistry. Sections have been added upon Rosenthal's phenol-tetra-chlor-phthalein test for liver function, the flocculation test for syphilis, the permittite method for ammonia in the urine, methods for bilirubin in the blood, the colorimetric method of adjusting the reaction of culture media, the

classification of streptococci, and methods of typing pneumococci, whilst many chapters have been re-written, especially that on sero-diagnostic methods

Whilst, however, the new edition thus contains completely up-to-date information,—especially in its biochemical methods,—the old is better than ever. Twenty-nine colour plates are included, and of special value, are the colour plates dealing with normal and abnormal blood cells these indeed being some of the best that we have seen anywhere. The microphotographs of the ova of intestinal helminths are of special value, and are very clear and striking, indeed the microphotographs throughout the book are one of its special features

The laboratory worker will find in this manual a mine of information, well printed, very freely illustrated, and well indexed for reference

**PRINCIPLES OF VITAL STATISTICS.** By I. S. Falk, Ph.D. Yale University, Philadelphia and London: W. B. Saunders Co., Ltd. 1923. Pp. 258. Price, 12s. 6d. net.

THIS small volume is an essay for the practising physician and health worker rather than a text-book for the public health student. As it deals with American statistical data which are differently recorded from those of England, the book is not adapted for teaching in India or England

It is interesting to find that a very large proportion of the states have not yet come into the federal registration association for births and deaths. Also one reads that the American calculates intercensal populations in terms of arithmetical progression and the author claims that this is more accurate than the English Registrar General's or logarithmic method of calculating increase by geometrical progression a statement which one finds hard to accept

*Corrigendum*—With reference to the review on p. 264 of our May number of Dr Krause's "Aids to Physiology," we have received a letter from Messrs Bailhere, Tindall & Co.,—the publishers—asking us to state that the 2nd, 1924 edition is the work solely of Dr R. A. Krause. Professor J. Tait, M.D. collaborated in the first edition but not in the second edition. Messrs Bailhere, Tindall & Co.'s letter was unfortunately not received until the May number was already out—Ed, *Indian Medical Gazette*

## Annual Report.

ADMINISTRATION REPORT OF THE JAILS OF THE BENGAL PRESIDENCY FOR 1922  
By LT-COL. W. G. HAMILTON, I.M.S.,  
CALCUTTA BENGAL SECRETARIAT BOOK  
DEPOT, 1923. PRICE, Rs 5-14

THE year 1922 was a most difficult one in the history of the prisons in Bengal. Owing to the non-co-operation movement a large number of "political" prisoners were admitted, and a special temporary camp jail was erected at Kidderpore whilst provision for extra prisoners was provided but not utilised, in the European Ward of the Mental Hospital at Berhampur, this ward being vacant, would have afforded a particularly suitable site of internment for such female non-co-operators as elected to go to jail. As a result of the movement the total number of prisoners admitted during the year was 84,985 as against 83,366 in 1921.

The movement as regards the jails indeed culminated in the two riots at the Presidency General Jail on the 26th of April and the 1st of October. On the first occasion, a Mohammedan convict having been assaulted by a warder, it was alleged that this had taken place whilst he was at prayers. A mob of some 300 to 400 prisoners attacked the warders and the superior staff and set fire to oil and jute godowns, inflicting considerable financial loss. Fire had to be opened, 9 convicts

were killed, 47 were wounded and 14 escaped—of whom 7 were subsequently recaptured. Among the jail personnel 1 warder died of injuries received, 5 were seriously and 31 otherwise injured. The aid of armed troops finally put an end to this "unseemly ebullition of misplaced enthusiasm."

This demonstration of "non-violent soul-force" not having succeeded, a further riot occurred on the 1st of October. On this occasion a report was spread that a convict in the jail hospital, who had had MacIntyre's splints applied for pain in the legs, was being tortured. Firing had again to be resorted to, but there was no loss of life. Two warders and 5 prisoners were injured.

In the subsequent judicial investigations, one prisoner was sentenced to rigorous imprisonment for two years, three for 18 months, and two for one year. Of 45 loyal prisoners who rendered good service, 8 were released, and 37 were suitably rewarded. Those of the warder staff who rendered conspicuous service in the first outbreak were suitably rewarded, and the offending head warder was punished.

The presence of these "non-violent" non-co-operators, also the differential treatment accorded to them in the matter of extra diet, comforts, and permissions, resulted in a most serious deterioration of the general standard of discipline among the ordinary convicts. On the 1st January, 1922, the number of such "political" prisoners was 3,617, at the end of the year,—chiefly owing to Government clemency in the remission of sentences,—it stood at 162. The district jail at Berhampur has now been set aside for the entertainment of this peculiar class of prisoner.

The year under review was therefore an entirely exceptional one. All three temporary jails were closed during the year, i.e., that at Kanchrapara, a temporary one at Nadia, which was not used, and the provision at the Berhampur Mental Hospital. During the year several of the Jail Committee's recommendations were given effect to. A warders' benefit fund was instituted, the star system of classification of prisoners was introduced, a new set of rules with regard to visitors was introduced, special provision with reference to religious facilities was given, and measures taken to remove all non-criminal insanes and mentally-defective prisoners to a special ward in Bhawanipur Mental Hospital in place of retaining them in prisons for observation.

The average daily strength of prisoners was 15,219 as against 14,660 in 1921, and the jails were in general overcrowded during the year. At present financial considerations render it impossible to adopt the Jail Committee's recommendation to separate central jails for habitual prisoners from district jails for casual and short-term prisoners.

There was also a regrettable increase in 1922 in the number of prisoners under 16 years of age, 687 for 1922 as against 338 in 1921. To a considerable extent the non-co-operation movement, which especially took advantage of the young and inflammable mind, was responsible. A scheme is under consideration for the establishment of a reformatory school and other industrial schools prescribed by the Bengal Children's Act. The Juvenile Jail at Alipore continued to do useful work, and here—since the introduction of the star system of classification and the reformatory scheme,—matters have improved considerably. The ratio of prison discipline offences has sunk from 73 per average population in 1921 to 32 in 1922. The Calcutta Prisoners' Aid Society has rendered useful help in securing employment for such discharged youths.

The large percentage of short-term sentences still calls for remark. Although such short-term sentences may appear to magistrates to solve many difficult problems their effect upon the casual and non-habitual prisoner is disastrous, he is only too often thereby converted by association with habitual criminals into a life-long recidivist. During the year under review no less than 31 per cent of sentences were for periods of less than one month, 24 per cent for periods of from

one to three months, and 18 per cent for periods of from three to six months, or a total of no less than 73 per cent for less than six months, convictions for theft being a predominant feature of such short-term sentences. This "system" is hopeless, either such a casual offender is a first case and should be treated leniently or else he is an habitual who should be severely dealt with. The harm which results from sending youths under 16 and casual first offenders to a general jail for a short-term sentence is one which is recognised and commented upon by every Inspector-General of Prisons in India. Here it is of interest to note that habituels form at least 22 per cent of all jail admissions during the year, such offenders should be separately segregated in separate jails, where they cannot poison the minds of the youthful or the casual offender.

Despite the unusually large number of prisoners dealt with during the year offences against discipline totalled only 16,823 as against 16,338 in 1921. The number of punishments inflicted on warders was 955 as against 908 in 1921 and 55 warders resigned as against 52 in 1921. The remission system is reported to be working well, whilst the Claude Martin Fund, under which grants are made to released prisoners, is very helpful.

Financially the year was expensive, Rs 3,70,631 being expended on buildings and Rs 2,27,120 on repairs, the cost of the extra temporary jail accommodation being heavy. The total expenditure for the year was Rs 28,04,954 as against Rs 24,62,492 in the previous year. The total earnings in jail manufactures for the year was Rs 6,81,199. Among other items of interest in this connection are the manufacture of police, chaukidari and prison clothing at Madnapore Central Jail, the woollen factory at Dacca Central Jail, and the manufacture of quinine and cinchona febrifuge tablets at the Juvenile Jail, Alipore which made a total profit of Rs 1,69,935 during the year.

The sickness and mortality rates were low, the daily average sick being 43 per mille, and the death-rate only 18 per mille,—well below the previous quinquennial average. The more important diseases were dysentery—39 out of 240 deaths being due to this,—pneumonia, phthisis and malaria. Suri and Comilla Jails now have special tuberculosis wards to which tubercular prisoners are sent. In spite of the gross overcrowding which occurred during the year the health of the prisoners was exceptionally good. Barasat Jail which is in a notoriously unhealthy neighbourhood, and which has always had a bad reputation was reduced to the status of a Subsidiary Jail during the year.

The jail superintendents had an exceedingly trying and anxious time throughout 1922, but they and their staffs did excellent work and the following superintendents are singled out for good work done during the year—Major C. A. Godson, I.M.S., the late Major S. Chuckerbutty, I.M.S., Lt-Col. Thurston, I.M.S., Major Walker, I.M.S., Major J. A. Brachio, I.M.D., Rai S. C. De Bahadur, the late Major S. C. Pal, I.M.S. and Babu N. K. Ray and Dr. K. B. Narayan.

The root produces no inflammation or blistering

Yours, etc.,

K. G. KHANDLAKOR, M.B., B.S.

CIVIL DISPENSARY,  
MANDSAR, C. I.  
27th March 1924

[Dimock in his *Pharmacographia Indica*, 1890 Vol I, p. 458, mentions the use of the root in croup, and as a purgative and diuretic, and states that a syrup of the deep blue flowers is used as a colouring agent, but makes no mention of its use in leucoderma.—Ed *Indian Medical Gazette*.]

## IN AUTOMATIC FLY PROOF LATRINE SEAT

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR—May I be permitted to encroach on your space in criticism of the article on an Automatic Fly Proof Latrine by Major Jolly in your issue of December, 1923.

Major Jolly states that the main disadvantage of my patent fly proof latrine seat is that the shutters are liable to be soiled. The shutters can only be soiled by an individual suffering from "explosive" diarrhoea when the pattern formed by his discharge would tend to spread laterally and then become liable to splash the vertically placed shutters. A solid or soft motion in the squatting position assumed by the Indian falls vertically 3 inches below the line joining the heels and could not soil the shutters.

The exceedingly simple mechanical arrangement for opening and closing the shutters of my latrine seat far transcends in mechanical efficiency the complicated system of levers instituted in Major Jolly's latrine seat. The frequent application of grease to eliminate friction and the close supervision and discipline required in the use of Major Jolly's seat places it in my opinion out of the sphere of practical politics.

In both our seats a few flies may regale themselves during the act of defaecation and be subsequently entrapped by the closing of the shutters. But I think the upward sweep from the vertical to the horizontal position of the shutters of my latrine seat will tend to flick away the flies whereas in Major Jolly's latrine seat the shutters run in horizontally without any such flicking action.

The further criticism by Major Jolly that the foot rest of my seat is awkward owing to its lateral slopes is more imaginary than real and does not militate against its comfortable use.

If Major Jolly should care to give a fuller trial of my latrine seat in his district, Messrs Massey & Co., Ltd. Madras who are the sole manufacturers of the seat would be pleased to send quotations for any number that may be required as individual or grouped seats.

Yours, etc.,

W. R. J. SCROGGIE

Lt-Col., I.M.S.

GOVT. MENTAL HOSPITAL, MADRAS  
MADRAS,  
18th March 1924

## Correspondence.

### CLITORIA TERNATEA IN LEUCODERMA

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR—I have recently seen beneficial effects in leucoderma by applications of the root of white *Clitoria ternatea*—(*Gokarna Vishnu—Krantu*)—in water. May I enquire whether any of your readers have used it for this purpose, and if they have, with what results?

### INTRAVENOUS IODINE IN PLAGUE

To the Editor "THE INDIAN MEDICAL GAZETTE."

SIR—It is Colonel Jeudwine's article on the intravenous use of iodine in your December 1923 issue, which inspires me to write to you this short note.

This note is on the treatment of plague because Colonel Jeudwine has recorded its use in this disease in only a small number of cases, therefore I think it may not be out of place if I give my experience of the method in about one hundred cases of plague, in which there were many cases of septicemic and pneumonic varieties.

I tried different methods for the treatment of this plague and finally decided to inject iodine intravenously in the hope of killing the bacteria in the blood-stream, and for this purpose made a solution of iodine 2 grms, potass iodide 3 grms and sterile normal saline (0.9 per cent) 125 c.c. Of this solution 10 c.c. is injected intravenously once a day for three days consecutively. The bubo, if any, is incised not excised, and a strophanthus, strychnine and quinine mixture given orally every six hours. With this treatment,—the condition of the bowels being also attended to—most of the patients recovered in a week's time. In those cases where treatment was begun before the onset of delirium the treatment was very successful, but where delirium commenced before the treatment was begun, it was almost a failure, as far as I remember, only such four cases were saved out of some 25. On the whole, however, my estimate of the success of the treatment may be placed at a figure of 75 per cent.

Yours, etc,

S Z NAQUVIE, I M P

Medical Officer Jalalpur Dispensary, Fyzabad  
28th February 1924

### "DENTAL SURGERY FOR MEDICAL PRACTITIONERS"

To the Editor, "THE INDIAN MEDICAL GAZETTE"

SIR—In reviewing my book "Dental Surgery for Medical Practitioners" the reviewer says that "it should be very helpful to any medical practitioner who desires some general knowledge of dental surgery" and I thank him for that. While doing so, however, I feel I must also show my disappointment at the method used by him. A reviewer, to my mind should examine the book in its broad aspect, which it is supposed to present to its readers, and show the public whether or not the author has succeeded in that object. Instead of that I regret that the reviewer has chosen a few minor, unimportant, and moreover controversial points for criticism. To assure the readers of my book that, in spite of my reviewer's criticism of these points, I am right in upholding all the statements in my work, it is necessary to answer his criticisms, and to request you to be good enough to insert this letter in your next issue. I will answer his points in order.

1 Commenting on the subject of *tartar* he says that pus is not one of the constituents of it. That I have not said that it is, will be clear to him if he will read the passage again. What is meant is that a piece of tartar just removed from the mouth when examined under a microscope will show, among other things mentioned on p 46, some pus cells also.

2 Commenting on my statement on p 56 that carbohydrate-eating Indians are freer from caries than are meat-eating Europeans, he remarks that "it may be true." On that point I may assure him that it not only "may be true" but that it is true. He seems to have an idea that I attribute the enormous extent of caries among Europeans to a meat diet, I have never said so, for I know it is not so. For my part I think that their unhygienic habit of having their tea and chotahazri in bed without cleaning the mouth, and their excessive use of chocolates and other sweets are responsible for the condition.

Regarding his remark that "the tremendous prevalence of pyorrhoea among Indians is largely due to the soft nature of their diet," after a close observation of several years I have come to the conclusion, that it is more, nay practically entirely due to the excessive use of *batwal* or *min twigs* for cleaning the mouth and the *pan-sopari* that an Indian chews practically the whole day. My opinion on this point is upheld by other observers in this subject, from East Africa and Siam.

4 As for his criticism of my recommendation of a hard tooth-brush, I will only say that it is a matter of

opinion. But I maintain on the strength of considerable observation that a hard tooth-brush will clean the teeth better than a soft one.

5 For an answer to his recommendation of *mouth-washes* and *pastes*, I will make a present to him of an article on mouth-washes and tooth pastes by Dr Zarbough in *Oral Topics* of April 1920. That article quotes from a lecture on mouth-washes and tooth-pastes by Prof H C Kelly that "Many are merely frauds, containing mere soap dissolved in water and lightly coloured and flavoured. To purchase the ordinary tooth-liquids (my reviewer's mouth-washes) is a waste of good money." Of the tooth-pastes (with which my reviewer is so enamoured) Dr Zarbough says "Tooth-pastes are a snare and a delusion. While they have not the same fault that washes have, as the patient will use the brush with the paste, still the most harmful thing about the pastes is the fact that they contain enormous quantities of glycerine, soap, and oil to keep them soft and saleable. Glycerine and soap should never be used in the mouth, because of their softening effect on the gums. They become soft and spongy, and then bleed."

Exactly the same is my opinion of these mouth-washes and pastes, and I have declared it in my lectures at the Grant Medical College since 1915, *i.e.*, long before the appearance of the article in *Oral Topics*.

6 In sympathy for the suffering poor Indians in places far away from dental help, he disagrees with my advice to medical practitioners to stop short at palliative treatment and to leave legitimate dental treatment to the dental surgeon, and suggests that the medical officer should have a knowledge of simple filling of teeth. It is indeed good of him to care for the dental sufferings of the poor, but the method suggested for its relief is wrong. To encourage medical men to get a superficial knowledge of dentistry and to practice it on the poor, will be encouraging quackery. The correct remedy is to propose means (dental schools and hospitals) of producing qualified dentists in sufficient numbers for the large towns and out of the way places, instead of encouraging medical men to inflict their scanty knowledge of dentistry on the poor. If my reviewer knew the results of such infliction, as I and the Bombay public do, he would not suggest the remedy that he did.

7 As to his suggestion that all operators should learn to use only one pair of forceps I may say that it is a retrograde one. It reminds one of that huge joke of the dental manufacturers, the so-called "universal forceps."

8 Disagreeing with my statement about the position of the gag, he asserts that there is only one place for the gag and that is the front of the mouth. I suggest that it is the only one place for the gag to successfully dislocate a tooth or two.

Yours, etc,

J J MODI, L M & S, L D S (Eng.).

56, ESPLANADE ROAD,  
FORT, BOMBAY, INDIA

March, 1924

### INTRAVENOUS AIR EMBOLISM

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—The correspondence that was started in your issue of January, 1922, by Major Porter, regarding the danger of injection of air into a vein, was lightly taken up, and unmeritedly dropped before a conclusive finding was arrived at. One feels uncertain whether Major Porter's optimism is justifiable *in toto*. The intravenous route is the route of necessity in the treatment of several intractable diseases. One should therefore be possessed of definite scientific knowledge regarding the effect of injecting air into the circulatory system. As regards Major Porter's point as to the "admission of a bubble or two of air into a vein in the forearm,"—one is not sure whether an air bubble, in a hypodermic syringe, which rises and comes up to

the piston as soon as the syringe is tilted for puncturing the vein, ever passes into the circulation. I have often noticed such a bubble flattening up and accommodating itself in the space between the piston and the nozzle of the syringe. In fact, a small volume of air, when coming last, can rarely be forced into the circulation against the pressure of the blood at the point of the needle. This will explain away all the communications that were published in the January and April, 1922, numbers of your journal. But when an air bubble is incarcerated and forced from behind by a column of liquid—as would be the case with a saline transfusion or salvarsan apparatus—then there should be no doubt about the passage of the air into the circulation. But then patients have died as the result of this accident.

It is no use quoting from standard authors to support one's argument, for air embolism has seldom been discussed in the books. What Dr R S Grewal quotes from Carliss' "Surgery" is not to the point. The passage is palpably meant for a solid embolus. It would be a great advantage if some one possessing the necessary facilities could take up the question and experiment on animals and publish a report on a thorough scientific basis. Otherwise, optimism may gradually lead to negligence, and in its wake, to disaster.

Yours, etc.,

R. K. BHATTACHARYA, M B

NABADWIP  
23rd March, 1924

#### BRITISH INCOME-TAX REFUNDS

To the Editor, "THE INDIAN MEDICAL GAZETTE"

SIR,—A misleading impression appears to have gained currency, through the press that persons claiming refunds of British income-tax have been called upon to pay duty on income derived from sources outside Great Britain.

An impression so utterly false and entirely erroneous in its conception and distinctly libellous on the British Inland Revenue authorities should be immediately refuted.

Applications for the refund of British tax cannot in any way involve a person permanently residing outside Great Britain in tax on income derived from sources outside that country or in any liability whatsoever. On the other hand, every person of British nationality who derives income from Great Britain in any form (which is always taxed at the highest rate current) may recover the whole or at least a proportion of the tax so deducted.

If there is any point in this connection on which any of your readers would like enlightenment, I shall be pleased to answer any queries sent to me at 13, Buckingham Palace Gardens, London England.

Yours, etc.,

WILFRED T FRY

13, BUCKINGHAM PALACE GARDENS,  
LONDON SW1  
5th February, 1924

#### THE BRITISH EMPIRE EXHIBITION

We have received from the Deputy Director-General, I M S, a copy of a letter from the Secretary of the Royal Society of Medicine to the High Commissioner for India, dealing with the arrangements made for welcoming medical visitors to the British Empire Exhibition, as detailed below which will be of interest to medical men visiting the United Kingdom this year.

#### THE HIGH COMMISSIONER

INDIA OFFICE,

42, GROSVENOR GARDENS, S W 1

DEAR SIR,—You have probably seen it announced that this Society in conjunction with other medical

societies in London, is endeavouring to organise a special welcome to medical visitors coming to London for the Exhibition, and it is important for our purpose that this should be known as soon and as widely as possible. It seems that the most practical way of gaining this object is through the press of the various Dominions, and we shall be glad to know whether your office might be depended upon to inform the editors of the various journals and ask them to inform the members of the profession in your country, and to ask them if they are intending to come to London to inform our Committee as soon as possible of their intended visit and the date of it.

The Committee has appointed a special Secretary to deal with all correspondence, viz Mr Mortimer Woolf, F R C S and he should be addressed at our office at 1 Wimpole Street. I am sure we may depend that you will do what is possible to make our efforts practical.

Yours very truly,

(Sd) J W MACALISTER

THE ROYAL SOCIETY OF MEDICINE,  
1 WIMPOLE STREET, LONDON, W 1  
11th March 1924

## Service Notes.

### OBITUARY.

Sir Walter James Buchanan, K C I E., M D., Lieut-Colonel,  
I M S (ret.)



—We very much regret to record the death from pneumonia on March the 22nd of Sir Walter Buchanan at his residence in Dublin. He was the son of Robert Buchanan of Fintona, County Tyrone, and was educated

at Foyle College, Londonderry and Trinity College, Dublin, where he graduated B A, M B and B Ch in 1887. He won the travelling medical scholarship at Trinity in 1887, studied in Vienna, and took the diploma in State Medicine of his university in 1888. After holding the posts of resident surgeon at Sir Patrick Dunn's Hospital and at the National Eye and Ear Hospital in Dublin, he entered the Indian Medical Service in October, 1887.

His first four years in the service were spent in military duty, during which time he served in the China—Lushai campaign of 1889-90, gaining the N E frontier medal and clasp. Attaining to civil employment in 1892, he first served as civil surgeon of Midnapore, and then joined the Jail Department. For the next twenty-seven years his activities centred on two subjects, the improvement of the prisons of Bengal, and the *Indian Medical Gazette* which he edited for twenty years. The success of this journal is indeed largely due to the labours of its two most brilliant editors, the late Colonel Kenneth McLeod, who edited it from 1871 to 1892, and Sir Walter Buchanan, who edited it from 1899 until his retirement from the service in 1919. The *Gazette* was fortunate in getting into the hands of this very able organizer. His great literary ability and taste were apparent from the moment he took over charge, and the circulation and influence of the *Gazette* improved enormously.

In the Jail Department, Sir Walter Buchanan's activities were untiring. He served in turn as Superintendent of Bhagalpur Central Jail, for a short time as Superintendent of Alipore Central Jail, and was appointed Inspector-General of Prisons, Bengal in 1902,—a post which he held for seventeen years until his retirement. Under his administration, the sanitation of the Bengal prisons was enormously improved, whilst the death rates were substantially reduced. His fine work in the department was recognised by the award of the C I E in 1913, and promotion to K C I E in 1918. He was on the Indian Prisons' Commission of 1919-20, and much of the value of the reforms introduced by that Commission,—reforms which are to-day making for material improvement in the prisons of India,—was due to Sir Walter Buchanan's labours.

and it was with genuine regret he left India and the work which he loved so well. He was a pessimist to the end as to the future of the Service he adorned for so long. His death adds another name to the long roll of honour of Bengal officers whose devoted labours on behalf of India have been followed by but a few scanty years of leisured retirement.

Major F W Cragg, M D, D Sc (Edin), FRSE, FES, IMS



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*pp 70 and 100 Report of Joint Committee  
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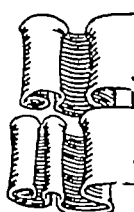
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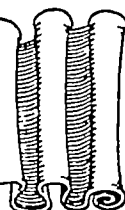
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From Bombay he reverted to his post as one of the Assistant Directors at the Central Research Institute Kasauli, and commenced work which resulted in a further series of entomological papers of great value. Throughout the whole of his entomological papers,—however, detailed and technical they might be,—Cragg never lost sight of their bearings upon wider and more general problems. He would ever revert to the biological laws and principles underlying his research. One of the most noteworthy of his contributions to medical literature, for instance, is his series of papers in 1920–1923 upon the distribution of the Indian species of rat fleas, in which he showed the correlation of the prevalence of *Xenopsylla cheopis* with plague, and the absence of correlation of *X. astia* and *X. braziliensis* with plague,—a paper with a wide practical bearing since a study of the species of rat fleas prevalent in any locality may determine its susceptibility or otherwise to plague.

In 1921 he set to work upon the problems of relapsing fever in the United Provinces and reverted to the same subject in 1922 on his return from leave. In a series of most important papers he demonstrated the epidemiology of the disease in the United Provinces, experimentally proving its transmission by lice, and shewing how the epidemic years were associated with an abnormally low temperature and abnormally high humidity during the spring months, which prevent the annual delousing of the population that usually occurs with the onset of the hot weather, and prolonging the life of the pediculi concerned. During this investigation, he contracted a severe attack of relapsing fever himself—an attack which weakened a constitution already impaired by years of overwork and attacks of malaria.

In spite of ill health, however, Cragg remained vigorously at work. The problem of the existence of typhus fever in India and especially of its importation into India over the North West Frontier came up for consideration, and, at his own request, Cragg was deputed to study it in December 1923. Proceeding to Kashmir he shewed that some at least of these epidemics of "typhus" fever were in reality, epidemics of relapsing fever,—especially that in the Lolab Valley. Another epidemic, however, which was raging among villages on the road up to the Kashmir Valley, presented peculiar features. Its clinical features were those of typhus, but in other ways it differed from the classical description, and Cragg proceeded to Uri to study it. Here he contracted his fatal illness in the ill-lighted, ill-ventilated, insanitary hovels of the people who were the subjects of the epidemic under investigation. He was taken to Lahore, and the seriousness of his illness was scarcely at first realised. Realising the importance of establishing whether it was typhus or relapsing fever, Cragg himself insisted until he lost consciousness on the fullest notes of his own case being taken. It was only towards the very end of his illness that the Weil-Felix reaction became positive. It is sad to record his death from the very disease which he was investigating. It was hoped that he would have joined the kala-azar commission which is about to be appointed to investigate the mode of transmission of the disease as entomologist, and his loss in this connection also will be severely felt.

In Major Cragg, India loses one of her few really brilliant entomologists, and his loss can ill be spared. He was a rapid, accurate and most painstaking worker. His energy was enormous, and he would often work far into the night. Socially, he was a delightful companion and host, and gifted with a keen sense of humour. He was an ardent follower of the cult of physical exercise, very fond of walking, and an excellent shot with both gun and rifle.

Major Cragg leaves a widow and two children, who are in England. To them we convey the sympathy of the whole Service in India. India can ill spare the loss of one of her most distinguished and brilliant medical research workers. We trust that Government will mark its appreciation of the devoted service which he rendered to this country.

#### APPOINTMENTS AND TRANSFERS

ON return from leave, Lieutenant-Colonel H B Steen, M.D. I.M.S. Civil Surgeon, did general duty at the Medical College Hospitals, Calcutta, from the forenoon of the 29th February 1924 to the afternoon of the 16th March 1924.

Major (now Lieut.-Colonel) R M Barron, D.S.O., I.M.S., to be acting Lieutenant-Colonel from 22nd July 1916 to 18th October 1919, whilst commanding a Casualty Clearing Station, Mesopotamia.

Major T L Bomford, M.B., I.M.S. is appointed to act as a Civil Surgeon and is posted temporarily to Murshidabad, *vice* Lieutenant-Colonel A H Proctor, D.S.O. I.M.S., transferred.

Major H H King, I.M.S., is appointed to officiate as Assistant Director, Central Research Institute, Kasauli.

Major J A Sinton, I.M.S. is appointed to officiate as Assistant Director Central Research Institute, Kasauli, *vice* Lieutenant-Colonel S R Christophers, C.I.E. O.B.E. I.M.S., detailed for research work under the Indian Research Fund Association with effect from the date on which he assumes charge of his duties.

Major W Ross Stewart Indian Medical Service, Staff Surgeon, Bangalore, is appointed, in addition to his own duties, to officiate as an Agency Surgeon and is posted as Residency Surgeon Mysore, during the absence on leave of Lieutenant-Colonel R T Standage, C.I.E., I.M.S.

Major A G Tressider M.D. I.M.S. is appointed to officiate as Surgeon to His Excellency the Governor of Bombay with effect from the forenoon of 15th March 1924 during the absence of Lieutenant-Colonel G J Grafton Young, I.M.S. on leave.

The services of Captain C J Lodge-Patch, M.C., I.M.S., are placed permanently at the disposal of the Government of the Punjab with effect from the date on which he is confirmed as Superintendent of the Punjab Lunatic Asylum, Lahore.

The services of Captain J M R Hennessy, I.M.S., are placed temporarily at the disposal of the Government of the Punjab for employment in the Jail Department, with effect from the date on which he assumes charge of his duties.

Captain J F Holmes, I.M.S. to be acting Lieutenant-Colonel whilst holding appointments with Mesopotamian Expeditionary Force from 10th to 15th August 1918 and from 1st December 1919 to 1st February 1920.

Captain W C Spackman, M.R.C.S., L.R.C.P. (Lond.) M.B., B.S. (Lond.), D.T.M. (Lond.), I.M.S. is appointed to act as Civil Surgeon, Nasik, with effect from the forenoon of 27th March 1924.

#### LEAVE.

Lieutenant-Colonel H B Steen, I.M.S., was granted by the High Commissioner for India furlough for two months, in extension of the combined leave sanctioned in Notification No 2843-Med1, dated the 2nd November 1921.

Lieutenant-Colonel H B Steen, I.M.S. is granted furlough for three days from the 10th to the 12th November 1922, in extension of the furlough for two months granted to him by the High Commissioner for India.

Lieutenant-Colonel G McPherson, C.I.E., I.M.S., has been granted a further extension of leave for four months on medical certificate with effect from the 20th May 1924.

In modification of Government Notification No S 20/10 dated the 19th December 1923, Lieutenant-Colonel R. W. Anthony, I.M.S., is granted, with effect from the 9th March 1924, leave on average pay for seven months and twenty-five days combined with leave on half average pay for six days.

In modification of Government Notification No S 20/16, dated the 21st February 1924, Lieutenant-Colonel H M H Melhuish, I.M.S., Acting Director of Public Health, has been granted leave for six months with effect from the 30th March 1924.

Lieutenant-Colonel J B Christian, I M S, Civil Surgeon, is allowed leave for eight months with effect from the 27th March 1924

Major C J Stocker, M C, M D, I M S, Superintendent, Peshawar Jail, is granted 12 months' study leave, with effect from the 1st September 1924, or any subsequent date on which he may avail himself of it

#### PROMOTIONS

##### *Lieutenant-Colonel to be Major-General*

Alfred Hooton, C I E, *vice* Major-General William Ernest Jennings, M D, K P H, retired, with effect from the 11th January 1924 Major-General Hooton's tenure of appointment will reckon from this date

##### *Lieutenant-Colonels to be Colonels*

Thomas Bernard Kelly, D S O, F R C S E, V H S, *vice* Colonel W G Pridmore, C M G, M B, retired, with effect from the 1st November 1923, Colonel Kelly's tenure of appointment will reckon from the 6th March 1924

The promotion to his present rank of Major Trevor Laurence Bomford, M D, notified in Army Department Notification No 1557, dated the 5th August 1921, is antedated from 31st July 1921 to 31st January 1921

*To be acting Majors whilst holding appointments with Mesopotamian Expeditionary Force—*

Tempy Captain R E. Dadachanji, M B, from 1st January 1918 to 15th April 1918

Captain P D Chopra, M B, from 14th August 1918 to 31st December 1919

Captain J F Holmes, from 16th August 1918 to 1st October 1918 and from 13th November 1918 to 29th September 1919

Captain N M Mehta, from 2nd November 1918 to 23rd March 1920

##### *To be acting Major*

Captain (now Major) R de S B Herrick, D S O, I M S, to be acting Major while holding an appointment as Deputy Assistant Director of Medical Services From 13th September to 31st October 1919

#### RESIGNATIONS

Lieutenant I C Robertson, M C, I M S, dated 15th April 1924

The Governor-General is pleased to accept the resignation of the Hon'ble Major-General R C MacWatt, C I E, M B, F R C S, K H S, I M S, of his office of Member of the Council of State

#### RETIREMENTS

Colonel Bhola Nauth, C I E, K H P Dated 14th April 1924

Lieutenant-Colonel J M Holmes, M B, I M S Dated 30th January 1924

Lieutenant-Colonel L B Scott, M D, I M S Dated 5th March 1924

##### *Admissions to the Indian Medical Service*

J E Gray, J S Riddle, G P F Bowers Dated 8th January 1924

R McRobert, G Dockery, J C Drummond, F H Whyte 22nd February 1924

## NOTICES.

### NEW X-RAY TUBES

X-RAYS, LTD 11, Torrington Place, Gower Street, London, W C 1, have recently placed on the market two new models of X-ray tubes One is Philips' R I water-cooled tube, at £12-10-0, with asbestos regulator By the use of a special metal with the same coefficient of expansion as that of glass, the copper block of the anti-cathode is no longer required and the platinum cap or seal is also done away with This tube is constructed with a very small focal spot, and will stand up to a current of 5-50 millamps, at an equivalent spark gap of 5 in for radiography

The second is Philips' Vacuum Cooler tube, at £14-10-0 This is fitted with two water chambers, the inner one, of metal, screws right down into the back of the anti-cathode, and contains a small quantity of water under vacuum, the container being also surrounded by water in the outer chamber Directly the tube is used, the water in the metal chamber commences to boil,—being under low pressure,—and the heat generated in the target is immediately distributed along the whole length of the metal tube, and consequently throughout the entire length of the outer water chamber It is claimed that the increase of heat-distributing surface is about 100 times that of an ordinary water-cooled tube, and that vibration of the tube is absolutely avoided

### NATIVELE LABORATORY PRODUCTS

In the modern treatment of cardiac diseases three drugs stand pre-eminent, strophanthus, digitalis and quinidine, but it is of importance to prescribe pure products In a series of small brochures the Nativelle Laboratory, 49 Boul, de Port-Royal, Paris, describe preparations of all three which are claimed to be of exceptional purity and standard composition The first is crystallised digitaline, which is put up in granules of 1/10th and 1/2 of a milligramme, in a 1 in 1,000 solution for oral administration, and in ampoules for intramuscular injection

A second and interesting preparation is "Solubaine,"—a 1 in 1,000 solution of Ouabaine, Arnaud, for oral and intravenous use Strophanthus is apt to be variable in composition but it is claimed that in Solubaine the glucoside, ouabaine, is constant in composition and reliability Here the indications are—(a) prolonged administration of oral doses of from 10 to 20 minims where it is desired to obtain a sustained cardiotonic effect in cases of early cardiac insufficiency, (b) medium doses of from 25 to 50 minims daily in right ventricular insufficiency, and (c) massive doses, 100 to 150 minims daily for two or three days, in acute cardiac insufficiency, and especially, after venesection in angina pectoris The preparation is claimed to be non-bitter and to be well tolerated

A third preparation is Quinacardine, a purified quinidine in tablet form This will be of interest to medical men in India not only from the point of view of treatment of cardiac arrhythmia, but also of the treatment of malaria with quinidine The tablets are of 20 cgms. each,—approximately 3 grains The chief indication in the former connection is for auricular fibrillation, with caffeine or digitalis in addition The tablets are claimed to be free from all traces of cinchonidine and hydroquinine

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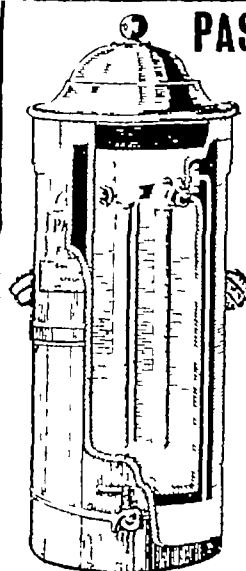
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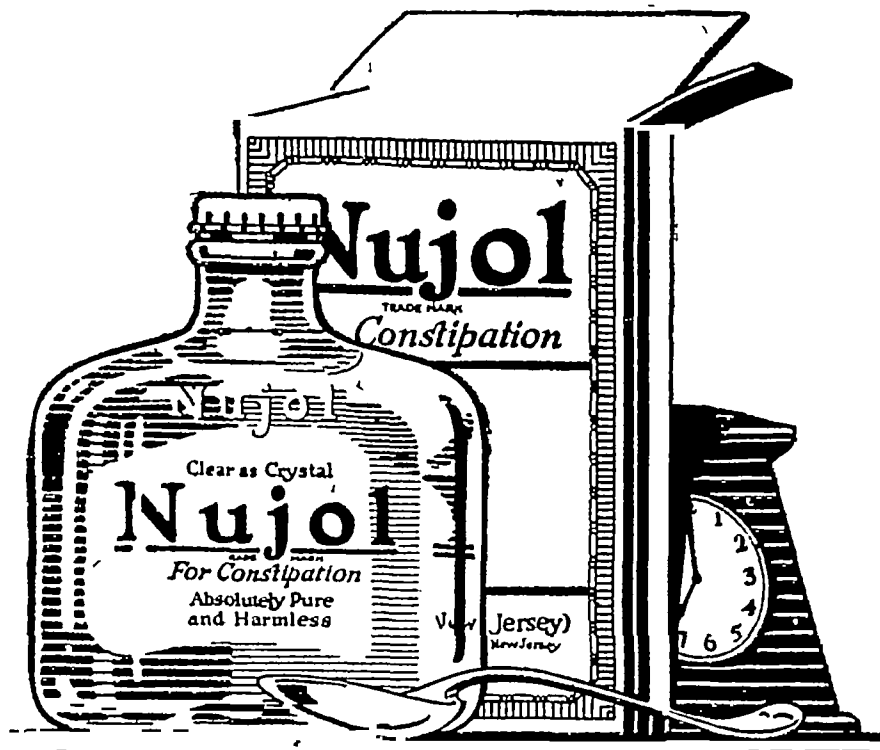
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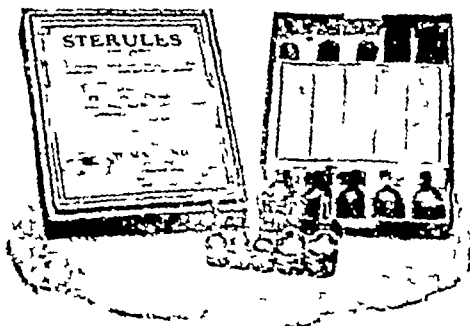
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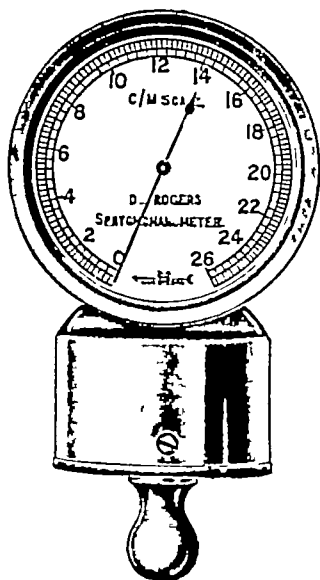
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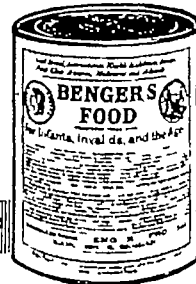
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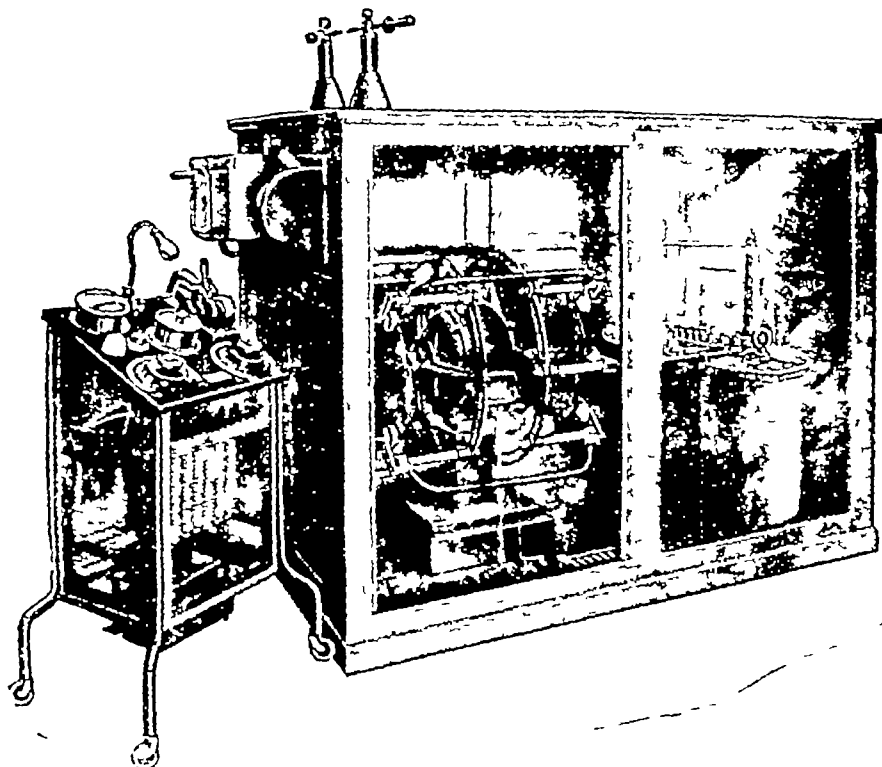
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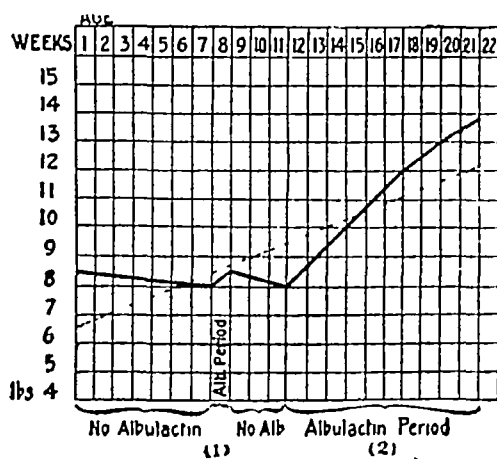
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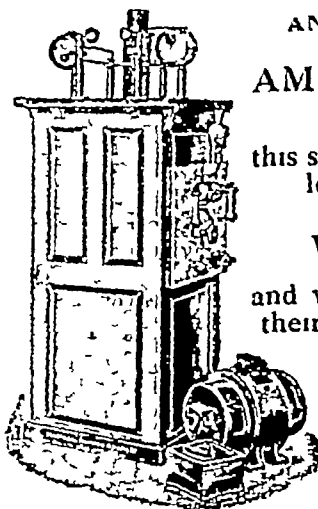


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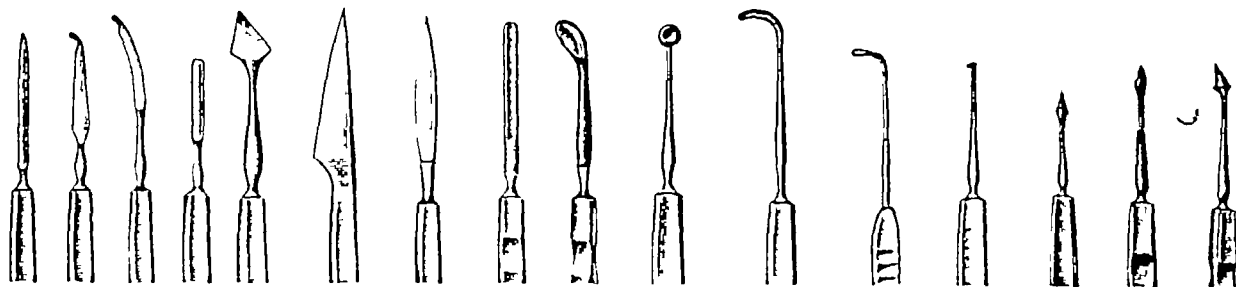
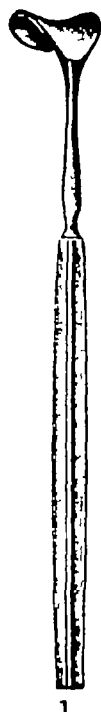
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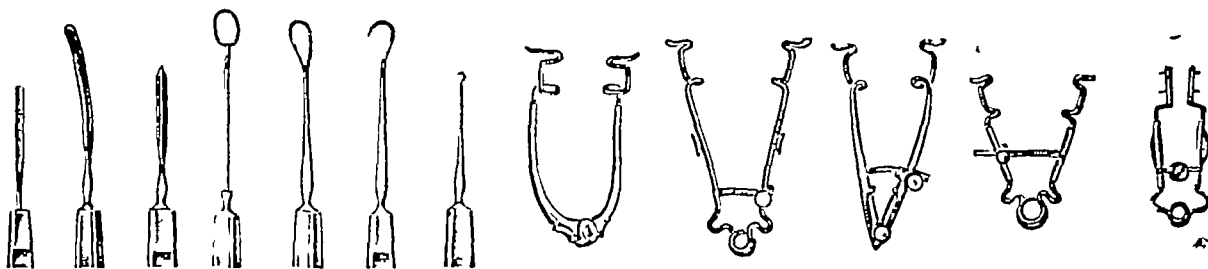
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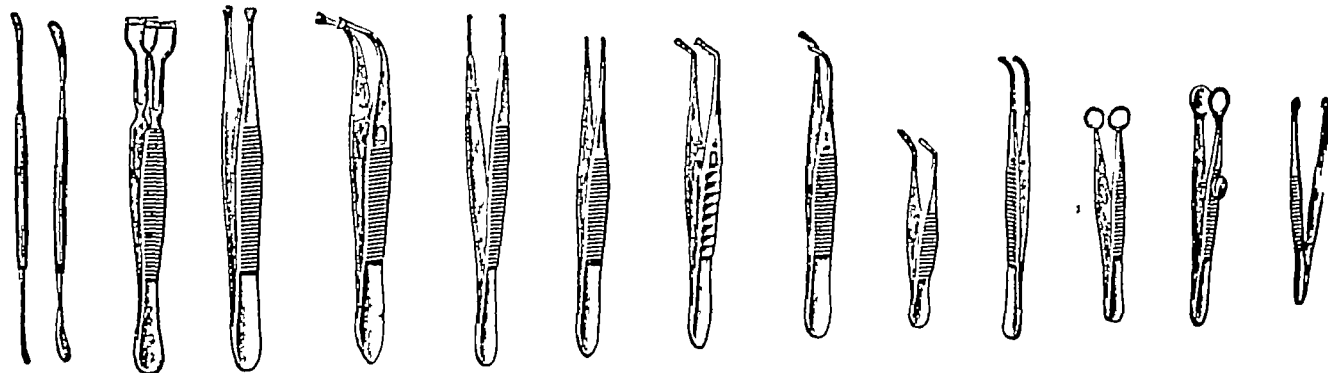
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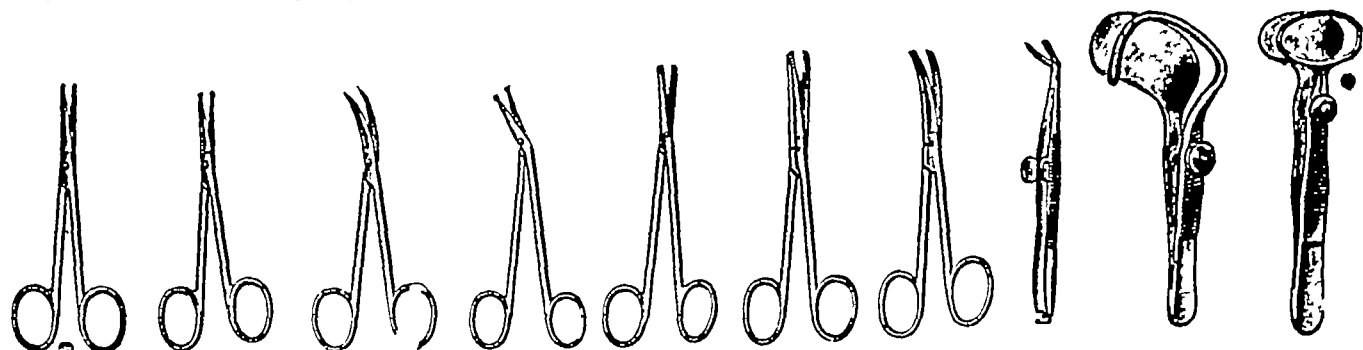
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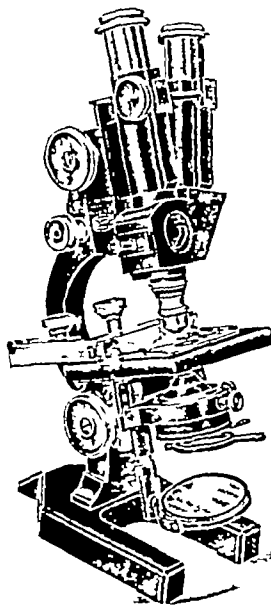
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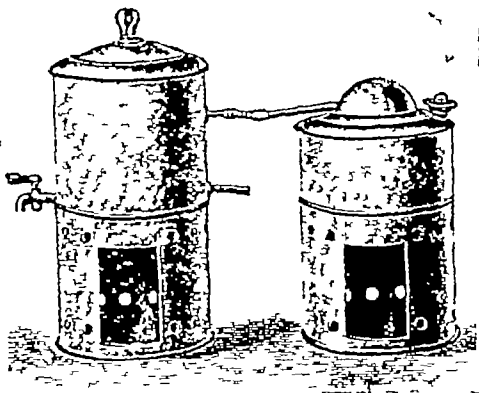
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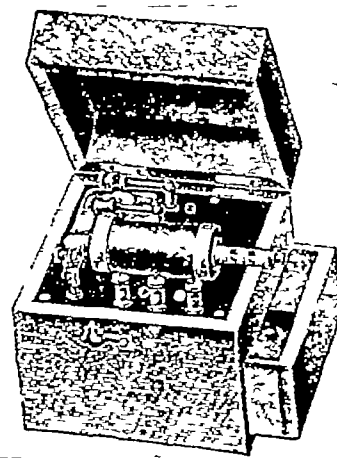
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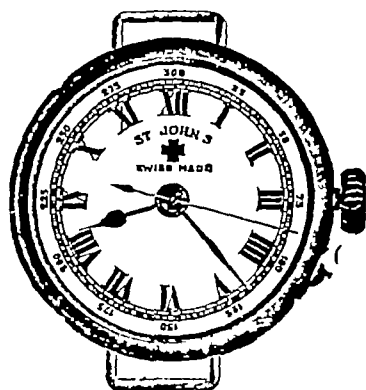
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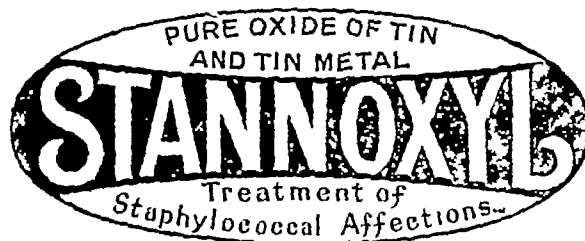
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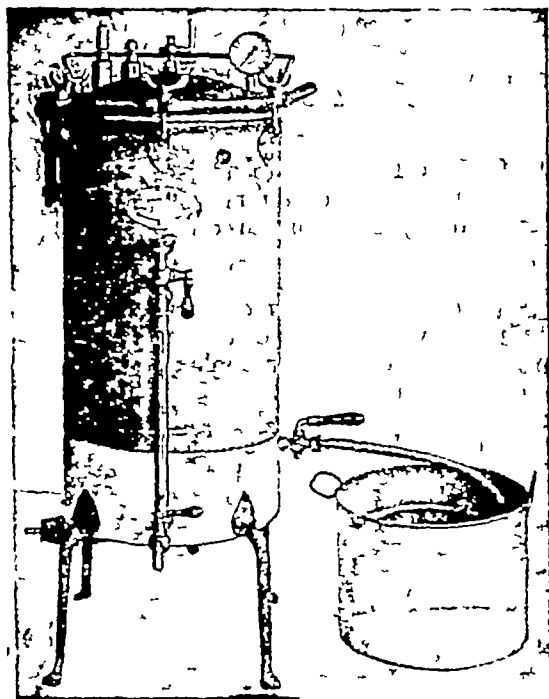
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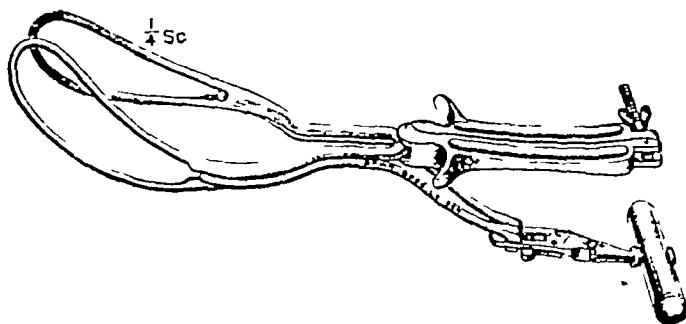
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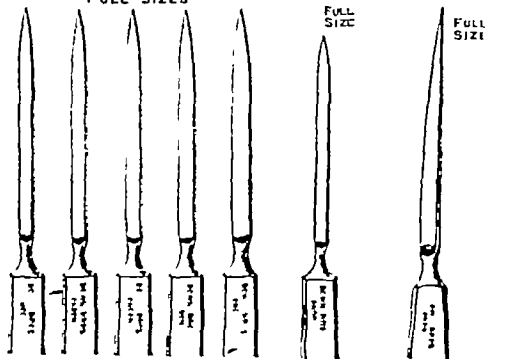


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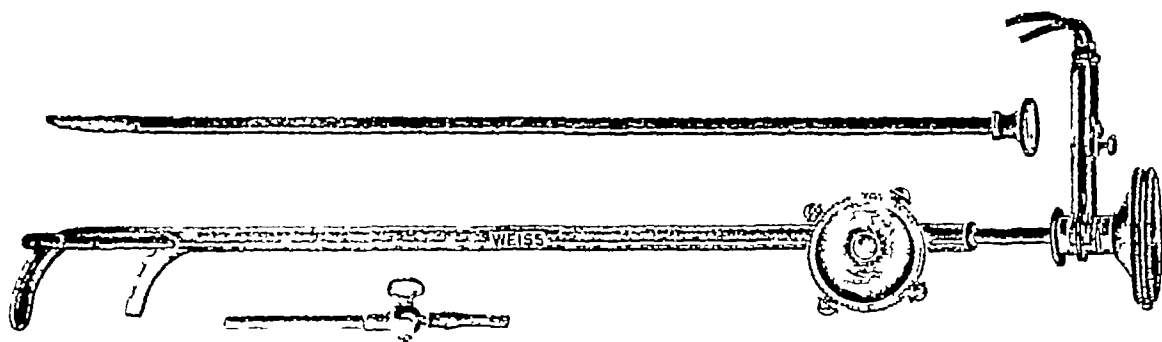
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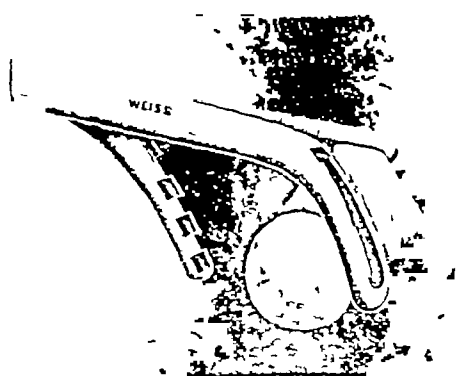
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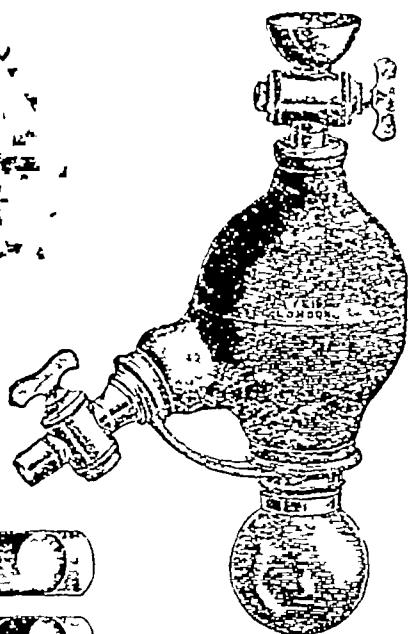
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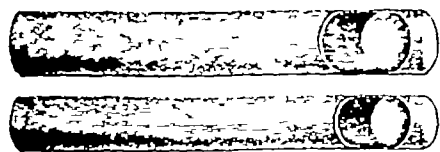
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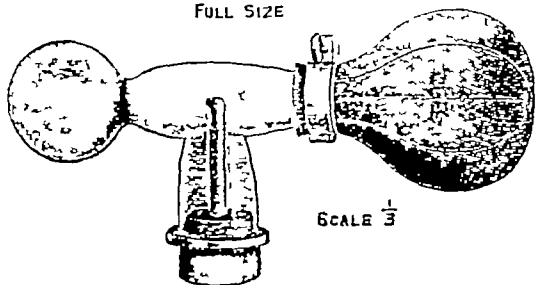
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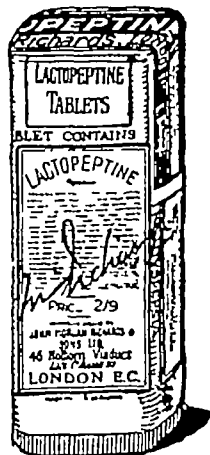
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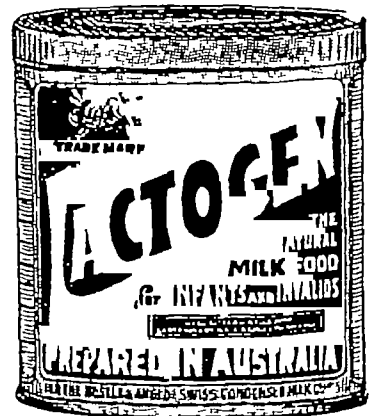
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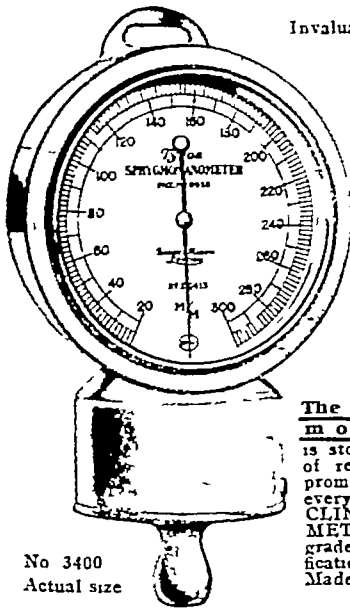
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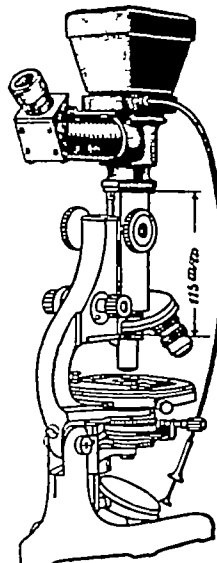
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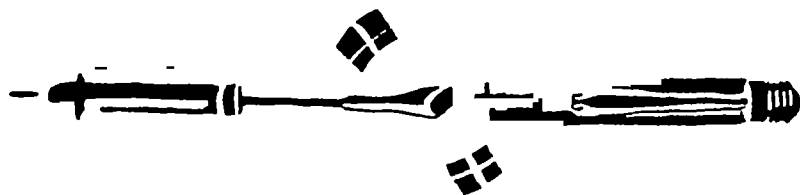
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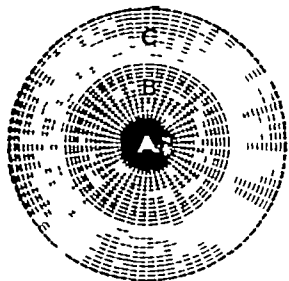
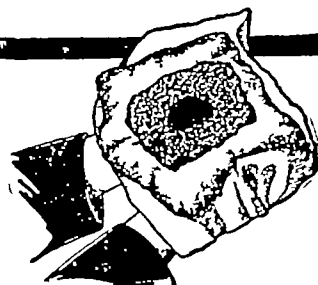


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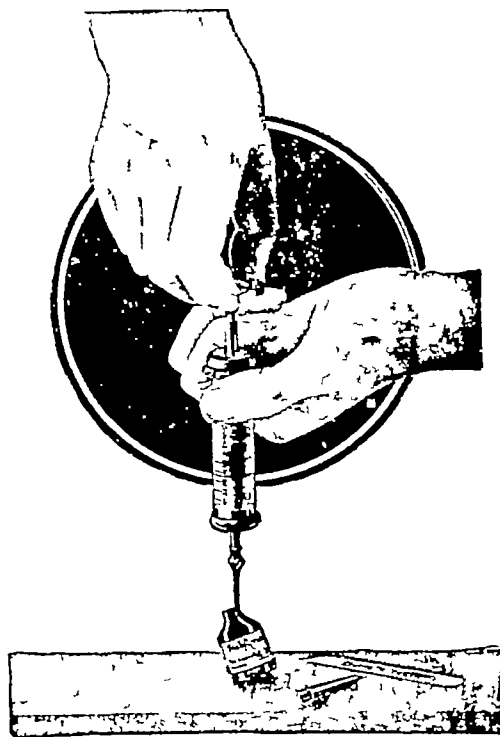
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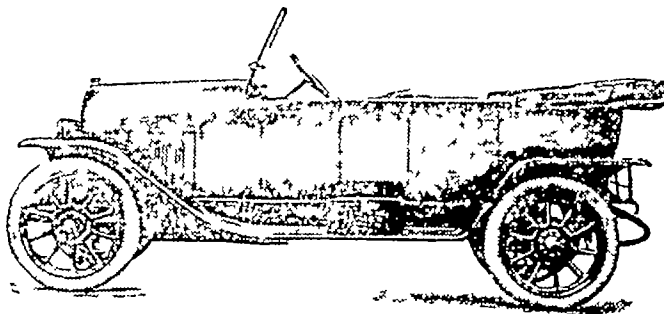
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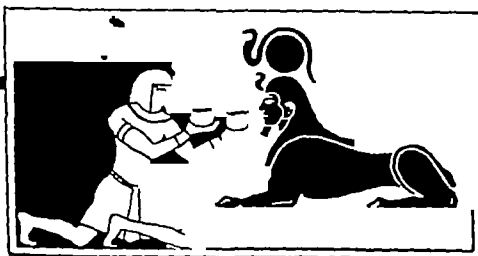
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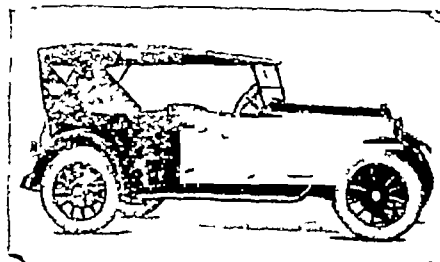
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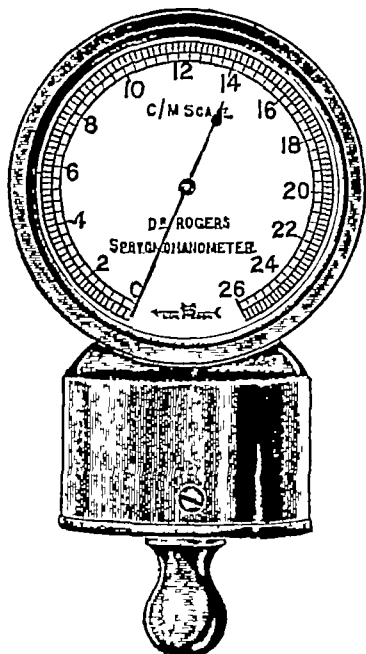
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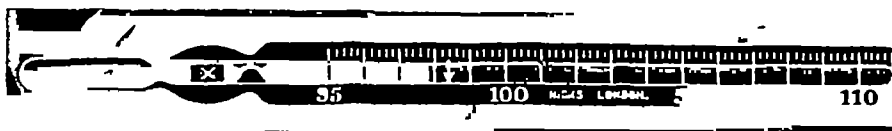
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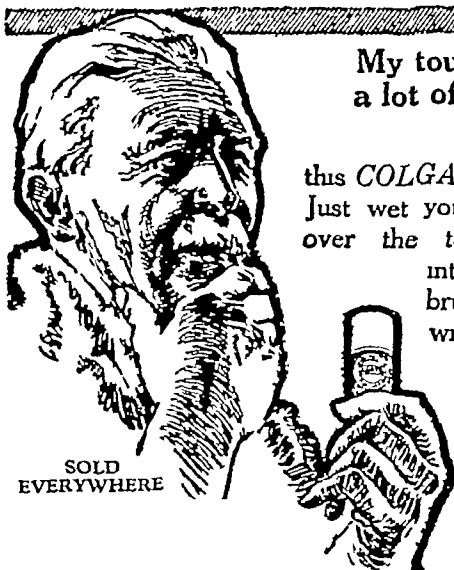
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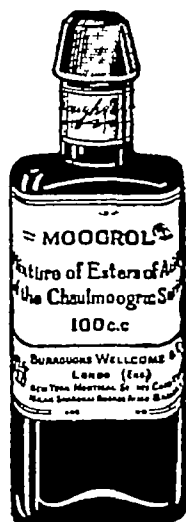
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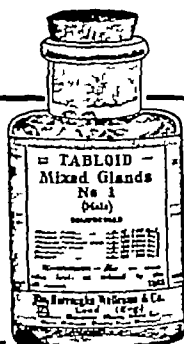
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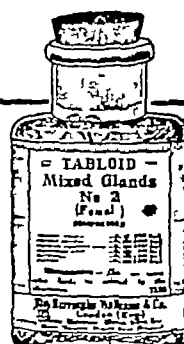
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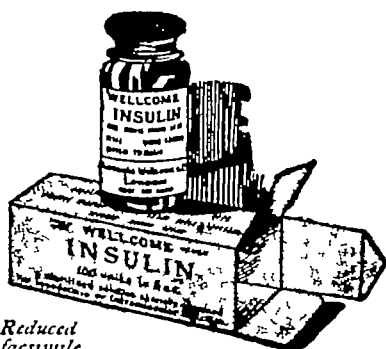
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## Original Articles.

### EXPERIMENTAL STUDIES IN BILHARZIA THERAPY (*S. SPINDALIS*)

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#### A PRELIMINARY REPORT \*

WITHIN the last few years the treatment of bilharziosis has been revolutionised by the discoveries of McDonagh (1915) and Christopherson (1917) regarding the efficacy of tartar emetic, and of Diamantis (1917) as to the beneficial action of emetine hydrochloride in schistosome infestations (*S. haematobium*). The value of these two dissimilar drugs has been established by clinical observation, but little, if any, experimental or pathological data have been forthcoming regarding the fate of the mature schistosomes in the portal system, the detailed mode of action of these two remedies, or their relative efficiency in permanently eradicating the disease. Such problems can most satisfactorily be settled by observation on a controlled series of experimentally infected animals as has been previously suggested by the writer. In Bombay there exists a species of mammalian bilharziosis (*S. spindalis*) which can be readily conveyed to goats, and in view of the limitations of accurate knowledge regarding the action of drugs in bilharziosis, it was decided to institute an experimental investigation along these lines. For this purpose nearly 100 animals have been artificially infected. The present preliminary report deals with 30 of these, 10 of which have been treated with tartar emetic, 6 with urea stibamine (Brahmachari) and 5 with emetine hydrochloride. In all cases these drugs have been given by intravenous injection into the jugular vein.

**Tartar Emetic**—In 1918 Christopherson demonstrated that tartar emetic was effective in the treatment of vesical bilharziosis (*S. haematobium*) and since that date has produced evidence of its applicability to other human schistosome infestations (*S. mansoni* and *S. japonicum*). His observations on its value in bilharziosis have been confirmed by numerous workers including Cawston (1920), Day (1921), Fairley (1919), Low and Newham (1919), Taylor (1919), Lasbrey and Coleman (1921) and others. Baujean (1921) has confirmed Christopherson's results in a series of nine cases of intestinal bilharziosis (*S. mansoni*). Sanders and Preston (1921) reported good results in three cases of *S. japonicum*, while Libby (1923) treated eight cases with undetermined benefit. The general consensus of

clinical opinion is that tartar emetic exerts a markedly beneficial effect on the course of all three types of human schistosomiasis and most observers incline to the view that it produces permanent cure.

**The Method of Action**—Christopherson (1919) maintains that tartar emetic is a specific cure for bilharziosis, killing off the adult worms and sterilising the ova which are deposited in the bladder and rectum,—the latter being the more important action on account of its prophylactic significance. Day (1921) supports Christopherson's opinion and regards the primary action of tartar emetic to be on the ovum. Fairley (1919) holds that the primary action of tartar emetic is on the adult schistosomes and that the evidence that this drug kills miracidia in the tissues of the host rests on less sure foundation. Experimental observation on monkeys suggested that normally mature ova must reach the exterior rapidly or perish *in situ* as a result of cellular-humoral and tissue reaction. Hence once the female worms ceased depositing eggs in the tissue, living ova would, shortly after, also cease to appear in the excreta. Hodson (1921) supports this view and estimates that the normal time taken for a crop of eggs to pass from the worm to the urine is from 5 to 7 days and that this is the period at which improvement takes place during tartar emetic treatment. Khalil (1922) investigated the effect of tartar emetic on the eggs and miracidia of *S. haematobium* and concluded in contradistinction to Christopherson that this drug in curing bilharziosis does not act directly on the eggs and that miracidia are not affected by concentrations of tartar emetic that can be obtained within the body during drug treatment.

**Permanency of Cure**—Another problem yet to be decided has regard to permanency of cure. It is conceivable that drugs might act on the generative organs of the adult schistosomes, causing temporary sterilisation with cessation of ova deposits in the tissues. Such action would be followed by the disappearance of living ova from the excreta and the amelioration of local vesical and intestinal symptoms. The resumption of functional activity would lead to fresh ova production and features of clinical relapse. During the present investigation an effort has been made to determine the average number of ova in the uterus of the female worm in treated and untreated animals. The average counts in the treated series have certainly been lower than in the untreated ones,—probably an expression of the general lowered vitality of the schistosomes under the toxic action of tartar emetic.

McWhae and Jagger (1921) and other observers have emphasised the frequency of the reappearance of ova in treated cases. In a series of over 20 human cases of *S. haematobium* (contracted in Mesopotamia) who had undergone intensive tartar emetic treatment, the writer has recently found strong positive complement fixation reactions to persist for as long as 12 months

\* Being a paper read at the Medical Research Section of the Indian Science Congress, Bangalore, January, 1924.

after cessation of treatment. Evidence of clinical relapse or the reappearance of ova in the urine was only forthcoming in 15 per cent of these, but the question naturally arises whether the more delicate serological test may not indicate the persistence of adult schistosomes in numbers insufficient to produce grosser clinical evidence of the disease. In other words, is tartar emetic, in a proportion of cases, merely reducing the parasitic level and converting cases of frank clinical bilharziosis into passive carriers, in whom ova are shed in such small quantity and at such irregular intervals as to escape detection on one or two isolated urinary or faecal examinations?

**Emetine Hydrochloride**—Diamantis\* (1917) showed that emetine hydrochloride administered in large doses was effective in the treatment of *S. hæmatobium*. More recently Erian (1919), Day (1921), Tsykalas (1921) and Cawston (1921) have confirmed his original observations. Tsykalas concludes that this drug cures the hæmaturia and kills the worms and embryos enclosed in the eggs. The course he advocates consists of from 10 to 12 grammes, injections being given intravenously every day for 8 to 10 days, the daily dose being 0.1 to 0.12 grammes. Cawston states that the depressing effects due to the large doses required by adults renders it a method which should be confined to children and young people.

**Colloidal Antimony**—Other preparations of antimony have been tried with a variable degree of success. Christopherson (1921) maintains that neither colloidal antimony nor stibenyl have come up to expectations as a substitute for tartar emetic. Day (1921) says that colloidal antimony is effective, children requiring 2 c.c. per dose and adults as much as 5 to 10 c.c., its advantage being that it can be given by intramuscular injection. Urea stibamine (Brahmachari) has exerted no beneficial action in infestations with *S. spindalis* during the present investigation.

#### THE PATHOLOGY OF *S. spindalis*

The paired adult schistosomes inhabit the mesenteric veins, the portal vein and its branches. More rarely they ascend to the gastric veins or wander as far afield as the splenic, pancreatic, or even the pulmonary vessels.

Maximal ova deposition occurs in the liver as well as in the mucosa of the large and small intestine. Next in frequency come the gall-bladder, the glands of the mesentery and portal fissure, the lungs and the pancreas. Rarely ova are

found in caustic soda digests of the kidney, spleen and bladder.

The most constant macroscopical evidence of bilharziosis is to be found in the liver. Here, in the early stages, are found bilharzial pseudo-tubercles scattered throughout the periportal zones, which later culminate in the typical periportal pipe-stem cirrhosis described by Symmers (1904) as occurring in *S. mansoni*.

Although deposition of ova in the intestine is constant, the tendency to dysenteric manifestations is less marked than in *S. mansoni* and macroscopic evidence of dysentery is a rarity at autopsy. Direct microscopical examination of the gut wall shows that ova are always immature when deposited in the tissues and attain maturity in the viscera of the host, not in the uterus of the female worm. In untreated animals the proportion of undeveloped ova is always high. Dark granular, dead ova are also constantly present in large numbers and both the undeveloped variety and the dead ova may exceed the proportion of ova containing mature, actively motile, miracidia. Under ordinary conditions ova are continually dying *in situ* in the tissues. Such knowledge is of the greatest importance when investigating the action of drugs *in vivo* on ova containing miracidia.

A not infrequent feature has been phlebitis of the branches of the mesenteric and portal veins. The clot which is found in various stages of organisation contains dead schistosomes and is a specially constant finding in successfully treated animals.

#### I TARTAR EMETIC IN *S. spindalis*

Nineteen animals which had been infected by applying cercariæ to the shaven skin were treated with variable amounts of tartar emetic. The number of cercariæ utilised varied between 76,000 and 163,000. In 18 out of 19 animals either worms or ova or both were found at autopsy. All 19 animals developed positive complement fixation reactions after being exposed to cercariæ. In addition, untreated animals of the control series invariably developed *S. spindalis* after contact with a similar number of cercariæ applied in identical fashion.

**Dosage and Course of Treatment**—Fresh solutions (1 per cent) of tartar emetic were prepared on the day of injection. As a general rule solutions were sterilised by heating in the autoclave for 20 minutes, but for some animals the drug was merely boiled for five minutes. Injections were generally given every alternate day, the maximum dose for animals of under 30 lbs weight being 4 c.c. of a 1 per cent solution. The total number of injections for each animal was between 13 and 45, while the total amount injected varied between 48 c.c. and 164 c.c.

**Effect of Treatment on the Adult Worms**—In 15 out of the 19 treated animals living worms were demonstrated at autopsy in the portal or mesenteric veins or in both. The ratio of male

\* Hutchison (1913) first recorded the efficiency of emetine hydrochloride in schistosomiasis in cases of dysentery caused by *S. japonicum* (vide *China Med J*, July 1913 Vol 27, No 4, pp 243-245).

Mayer (1914) treated a case of urinary and intestinal bilharziosis with a course of emetine hydrochloride subcutaneously. The blood disappeared from the urine and stools and the patient showed great improvement (vide *Munch Med Woch*, 1918, June 4, Vol 65, No 23, p 612).

and female worms was a variable one, but in both the treated and the untreated series of animals the females were in a minority. The average number of ova contained in the uteri of the females derived from different animals varied from 0 to 165, and on an average the female worms of the treated series contained fewer ova than those of the untreated one. As a rule the ova contained in about twenty female worms were counted for each animal.

*Effect of Treatment on the Ova*—Ova were demonstrated at autopsy in 16 out of 19 treated animals either by direct microscopical examination of the bowel wall, by examination of scrapings of the mucosa of the small and large intestine or by caustic soda digests of the various organs.

Observations on the condition of the ova were not always recorded, but in at least 9 out of 19 animals motile, fully developed, miracidia were demonstrated in ova in the bowel wall.

The distribution of ova in the viscera was widespread. They were found in the liver and in the small and large intestine in 15 animals and in the lung in nine. Less constantly ova were demonstrated in the mesenteric and portal glands and in the gastric mucosa, more rarely they were distributed in the gall-bladder, kidney and spleen.

In only three animals of the treated series were ova not definitely demonstrated in the viscera.

*Pathological Changes in the Viscera*—At autopsy bilharzial pseudo-tubercles were demonstrated in three animals, periportal fibrosis in five, and thrombosis of the branches of the portal or mesenteric veins in four. Microscopical examination of the liver showed very constant changes, especially cellular infiltrations in the periportal zone which might or might not be associated with deposits of ova.

*The Complement Fixation Reaction*—In the 19 treated animals the complement fixation reaction was negative prior to and during the first week of the disease, but subsequently positive reactions developed in all cases. In those animals in which post-mortem examination had revealed cure, the serological reactions had been converted from strongly positive types (+ + +)\* into weaker ones (+) or to definitely negative readings. In one case, where the reaction had changed to negative, both parasites and ova were demonstrated in quantity at autopsy.

*Conclusions re Treatment*—In 11 out of 19 animals tartar emetic definitely failed to cure and appeared to exert little if any influence on the course of the disease. In three, the parasitic level appeared definitely reduced though infection was by no means completely eradicated. In the five remaining cases complete or practically complete cure had been established. Reviewing these

results one feels that the therapeutic action of tartar emetic—at least in infestations with *S. spinalis*—has distinct limitations and is, on the whole, disappointing.

## II UREA STIBAMINE

Six animals which had been exposed to skin infection with from 100,000 to 163,000 cercariae, were treated with intravenous injections of urea stibamine supplied to me through the courtesy of Dr Brahmachari. The course of treatment varied in different animals, one receiving a total quantity of 145 cc, another 32 cc, and the remaining four 62 cc of a 2 per cent solution. Injections were given on alternate days. Freshly prepared solutions were always utilised and were sterilised by minimal heating as advocated by Brahmachari. Toxic effects were never observed to follow the administration of this drug.

*Effect of Treatment*—In all six animals adult schistosomes were found in the mesenteric or portal veins or in both situations. In 5 out of 6 animals they were noted to be motile. Ova were constantly present in the caustic soda digests of the internal viscera, while direct microscopical examination of the bowel wall and scrapings of the mucosa revealed living miracidia to be contained in a proportion of ova present. The complement fixation reactions persisted invariably positive in the case of all six animals.

Macroscopic evidence of bilharzial disease was noted in four cases. Two presented bilharzial pseudo-tubercles of the liver, one a periportal fibrosis and two showed bilharzial pylephlebitis.

*Conclusions re Treatment*—No evidence was obtained that urea stibamine exerted any beneficial therapeutic action in *S. spinalis*. The constant presence of living worms, the intensive deposits of ova throughout the viscera, and the presence of gross macroscopical lesions showed that the biological activities and disease processes associated with this species of bilharzia parasite remained entirely unmodified by treatment with this drug administered by the intravenous route.

## III EMETINE HYDROCHLORIDE

Eight animals were infected with cercariae via the skin, the number used varying between 100,000 and 142,000. A 1 per cent solution of emetine hydrochloride was used. The first three animals of the series died from over-dosage. It was subsequently estimated that for animals not exceeding 25 lbs weight 1 cc of a 1 per cent solution was the correct dosage and that injections should be given daily for 10 to 15 days. The actual amounts given in the five surviving animals varied, one receiving 105 cc, another 145 cc, and the remaining three 115 cc each.

*Effect on the Worms*—The rapidly lethal effect of intravenous emetine hydrochloride on adult schistosomes in the venous system was very remarkable. In two animals coming to autopsy 111 and 125 days after commencement of treatment, all worms had completely disappeared. In

\*Serological results are graded as + + +, + +, +, -  
 + + + = fixation of 6 M H D's complement (Positive)  
 + + = " 4 1/2 " "  
 + = " 3 " "  
 - = " Complete hæmolysis (Negative)

two others which were examined 13 days after the initial injection numerous worms were demonstrated, but they were all dead and in different stages of degeneration. In the last animal 39 out of 40 worms were dead, the sole survivor being a solitary male. In the untreated control series the adult schistosomes were invariably motile for a considerable period of time after autopsy. Female worms in these treated animals were always in a minority, only 4 out of 102 worms recovered being of the female sex.

**Effect on the Ova**—Direct microscopical examination of the bowel wall and of scrapings of the mucosa showed only dead ova in two of the animals which had received 10.5 and 14.5 c.c. respectively. In the two animals examined on the 111th and 125th day from the inauguration of treatment no ova were demonstrable. In one animal which had received 11.5 c.c. intravenously and which came to autopsy on the 15th day from commencement of treatment some ova containing living miracidia were observed. This was the animal in which one living male worm was also found.

Caustic soda digests showed the presence of ova in the liver and small and large intestine of four animals, and in the liver of the fifth. Where a long period of time had elapsed since the inauguration of treatment, ova were more scantily distributed throughout the viscera and in one animal they had almost completely disappeared.

**Complement Fixation Reaction**—Strongly positive complement fixation reaction (+ + +) had developed in all the five animals of the series prior to treatment. In three animals dying shortly after treatment had been commenced, the reaction was unmodified, but in the other two examined at later periods (111th and 125th day) negative reactions were established.

**Macroscopical and Microscopical Pathology**—In animals coming to autopsy within 15 days of commencement of treatment, characteristic lesions were present—namely bilharzial pseudo-tubercles in the liver and thrombosis of the portal and mesenteric veins. Microscopical section of the livers of these animals showed the characteristic cellular infiltration in the periportal zone with organising thrombosis in the branches of the portal vein. The defunct worms were observed in various stages of degeneration and disintegration and were being actively phagocytosed by leucocytes invading the schistosomes entangled in the fibrinous meshes of the clot. In the animals which were examined late after treatment (111th and 125th day respectively) no macroscopical lesions of bilharziosis were noted and microscopical section of the livers revealed but scanty periportal fibrosis with minimal round celled infiltration—the last remaining relics of schistosome infestation.

**Discussion**—Though the number of animals in this series was small, the presence of adequate controls and the uniformity of the results prove that in emetine hydrochloride we possess a drug

of maximal efficiency in the treatment of this species of bilharziosis (*S. spindalis*). Within a few days the adult schistosomes are killed off in the mesenteric and portal systems and carried up in the portal blood stream to the liver where they are filtered out in the portal vessels inducing ante-mortem thrombosis, the second step in their final disintegration and disappearance. Ova may persist for months after this process has been completed, but quite early it is impossible to demonstrate living miracidia in any ova in the bowel wall. Whether this is due to direct lethal drug action or is dependent on the normal short duration of life of the miracidia has yet to be determined, but in any case it is quite immaterial from the therapeutic view point. Emetine hydrochloride by the intravenous route constitutes a specific cure for this form of bilharziosis and yields results which are markedly superior to the more commonly adopted remedy for *S. hæmatobium*—namely tartar emetic. It will be very surprising if the superiority of emetine hydrochloride does not hold for the human types of bilharziosis as well.

#### Conclusions

1. Tartar emetic definitely failed to cure in 11 out of 19 animals experimentally infected with *S. spindalis*. In three animals the parasitic level was undoubtedly reduced and in five complete or practically complete cure was established. From the therapeutic point of view the results were disappointing.

2. Urea stibamine failed to cure in six out of six cases investigated, living worms and ova being demonstrated at autopsy and active pathological lesions persisting in the viscera despite full courses of treatment.

3. Emetine hydrochloride given by the intravenous route constituted an absolutely specific cure in five out of five experimentally infected animals.

4. This drug exerted a lethal action on the adult schistosomes in the portal system, which on dying were filtered out in the portal vessels of the liver inducing a secondary thrombosis—the second stage in their final disintegration by phagocytosis.

5. Ova persisted in the tissues for several months after the drug treatment, but diminished progressively in quantity. Living ova rapidly disappeared, but whether this was due to direct drug action or was dependent on the short span of life they normally possess in the tissues remains to be determined.

6. Pathological lesions in the liver and elsewhere disappear with the death of the schistosomes, organised thrombosed vessels or periportal fibrosis constituting the only relics of previous schistosome infestation.

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public, earlier than I should otherwise have done, a method of treatment first begun by me during the hot weather of 1923 and continued during the present year

The considerations which led me to seek a new method of treatment of this disease were many

During the War I had a certain amount of experience of cholera whilst in command of a General Hospital in Mesopotamia, and was struck by the apparent inadequacy of transfusion of hypertonic saline in many cases

And it was not always the cases first seen in a state of collapse that failed to respond to transfusion of hypertonic saline and administration of permanganate orally Many cases were admitted to hospital in which little time had elapsed from the appearance of the first symptoms, and yet a large number failed to respond to treatment In one epidemic of some 35 cases, in spite of transfusion with saline being immediately available, some 15 cases died Perhaps the strain may have been a very virulent one, but the fact remains

I admit that the first effect of transfusion is extremely gratifying as a rule To watch colour and pulse return to the cold and collapsed patient inspires a feeling of hope, but, alas, in my experience, the improvement is often fallacious Collapse returns, to be again combated by saline, and followed by a shorter transitory improvement, and hope is again mocked until the end comes

And it is not always the patient first seen in a state of collapse in whom this occurs I can remember two officers, one a personal friend, brought into hospital at the same moment The first, collapsed on admission, rallied under saline, only to collapse later and again rally under repeated saline, and die in the end The second, who shared his billet, was so rosy in colour, with a strong pulse, that one doubted the diagnosis for a moment He was transfused, collapsed subsequently, rallied like his comrade under the same influence, and died an hour before him These cases and others made a deep impression on my mind

The treatment often failed, even when given thus early, because the transfusion only combated a symptom, although a very important one Rogers, by administration of permanganate pills, endeavoured to deal with the root cause, the toxin factory in the bowel, but in my opinion he selected a relatively inefficient and unduly irritating antiseptic

An experience of urethral lavage shows that even quite weak dilutions of potassium permanganate are very irritating, and in my experience, the irritating effects of permanganate pills are so marked that they are often quickly rejected before there is much time for absorption, and, though a certain amount of toxin may in this way be got rid of there has been little time given for the diffusion of

## THE TREATMENT OF CHOLERA BY CRESOL

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THE publication of an article, in the *Indian Medical Gazette*, by Dr Tomb, on the treatment of cholera by essential oils leads me to make

the antiseptic or for its oxidising action on the cholera toxin

A pill is not an ideal form in which to exhibit a medicine intended for rapid diffusion. In such cases the concentration of permanganate in the neighbourhood of the pill may be very great, and I have seen the lips of a patient blistered apparently by permanganate. But whilst this high concentration of permanganate locally may irritate the stomach intensely and lead to rapid rejection by vomiting, an even diffusion of the antiseptic in the stomach and bowel contents is not so likely to occur as when the drug is given in liquid form, though, of course, permanganate may be so given.

As I have none of Rogers' original papers to refer to, I am in doubt as to the relative importance he attaches to the antiseptic action of permanganate on the cholera vibrio, and its oxidising action on that vibrio's product, the cholera toxin. Whilst admitting the latter, there may be some theoretical objection to giving an oxidising agent in the presence of an aerobic bacillus. However such theoretical objections would appear to be discounted by the improvement in mortality rates shown by Rogers since his introduction of the permanganate treatment.

The operation of transfusion, although a minor one, requires some care and attention to detail, and is more suited for a hospital than for the circumstances under which, in practice, so many cholera cases are first seen. A dark low-pitched hut in a village or labour lines is not an ideal site for even a small operation like transfusion, and when to lack of air and light are added high humidity and stifling heat, any practitioner who has had any experience of cholera under such conditions will grasp at any method which promises equal or better results, and is of more ease in application.

I can recollect one stifling evening in June in which I had to perform transfusion by the roadside in the light of the headlamps of my car. The patient, who was collapsed when first seen, died a few hours later.

And what of those cases of collapse in which, after the vein has been opened and the cannula inserted, the saline refuses to run, presumably because the blood is semi-clotted along the whole length of the distal vein selected?

It was experiences such as these which convinced me that only in early antiseptic treatment would any further improvement in cholera results be found.

A further review of one's experience showed that once a certain amount of toxin, short of a rapidly fatal dose, had been absorbed, death was very liable to occur a few days later from the effect of the toxin on the kidneys.

This too emphasises the need for early and radical treatment.

Again, the first person to see a case of cholera in a labour force or lines, and often the only one, is an Indian of the compounder or sub-assistant-surgeon class, and it is highly desirable that some treatment of easy application should be immediately available as every moment is precious.

For reasons such as these I decided upon an adequate trial of an intestinal antiseptic treatment.

Cresol and thymol were selected for trial for the following reasons. Both were comparatively non-toxic, and neither coagulated albumin.

The non-coagulation of albumin is, I consider, a point of considerable practical importance, as the antiseptic is more likely to act on organisms protected by a covering layer of albumin or mucus.

It was realised from the beginning that it would not be necessary to obtain a sufficient concentration of antiseptic to actually kill the cholera organism to obtain a favourable result.

To merely strongly inhibit its growth would be to lessen greatly the toxin production which is the essence of the disease. Considering the well-known vulnerability of the cholera organism to hostile influences, it was believed that a relatively low antiseptic concentration would turn the tide.

I regret that owing to total lack of facilities, this work has had to be entirely clinical. It must remain for others to determine whether the comma bacilli are actually killed, or only inhibited in their growth only.

Regarding the antiseptics selected for trial, since my first introduction to creolin in my student days, I have used various forms of cresol in medical and surgical practice since and found its applicability was a wide one. I therefore turned to it with most hope, but determined to give thymol a trial also.

A quantity of thymol solution was made up for one garden and the "doctor babu" there instructed to use it as directed, should a case of cholera occur.

In similar fashion instructions were given for cresol solution to be tried in any case of cholera in another garden.

The thymol action may be briefly dismissed. It was tried on a solitary case of cholera which recovered, but, in the meantime, a small outbreak of cholera occurred in another garden, and the results of cresol treatment were so encouraging that it alone was used in the treatment of subsequent cases.

In this outbreak, occurring in the hot weather of 1923, there were seven cases, and all were treated by one minim of cresol in an ounce of water every quarter of an hour. Six recovered and one died. The case which



died was transfused with hypertonic saline in addition. The ones which recovered had only cresol treatment. Naturally it was the most serious case which was transfused, so the death, in itself, is no reflection on transfusion.

In another garden sporadic cases of cholera occurred from time to time, and were treated by cresol with very good results. Unfortunately I have lost the record of these cases.

The more one sees of cholera, the more one realises that the shorter the time which elapses between the onset of symptoms and the beginning of treatment, the better the result. All our efforts should be directed towards treating the case earlier and lessening the toxin absorption, which beyond a certain amount will probably prove fatal.

When first beginning this treatment I was very much afraid that stronger doses of cresol than one minim at a time would excite vomiting, and consequently the first cases treated received small doses of cresol only. The toxicity of cresol is very low and did not give any cause for concern. Gradually the dose was increased until, in its present form, the treatment is as follows—

Immediately when seen the patient is given one to four minims of cresol, according to age and size, dissolved in a similar number of ounces of tepid water. This dose is repeated every quarter of an hour for a couple of hours, and then the interval between the doses is increased to half an hour, and later to an hour, two hours, etc., whilst at the same time the dose of cresol is slightly reduced.

If there is some vomiting after swallowing the medicine it is not of great importance unless continuous. In these cases the stomach as well as the bowel seems to be filled with toxic material, and to vomit such can only do good. It is frequent vomiting with little ejection of material that is most harmful. If the tendency to vomiting is excessive a hypodermic of  $\frac{1}{4}$  of a grain of morphine for an adult may be given, or liquor morphinæ, 40 minims, or tincture of opium, 20 to 30 minims, may be given with a first small dose of cresol, say two minims, and the dose increased to three or four minims of cresol if the first dose has not been quickly rejected, and has remained sufficiently long in the stomach to have had some effect.

In these cases the upper bowel, and probably the stomach too, is like a flask of broth in which the vibrios are multiplying with great rapidity.

The churning movements preceding vomiting must tend to diffuse the antiseptic more widely, and if it is only sufficient to slightly inhibit further growth, whilst at the same time the toxin already *in situ* is eliminated by vomiting and purging, it is all to the good.

For a case of dry cholera (if one sees the case alive) I should recommend an ounce of magnesium sulphate dissolved in two ounces of water and containing five minims of cresol to be given as an initial dose. I fancy elaterin might be suitable also, but it is no longer in the *Pharmacopœia*.

At the time of writing this paper I have had my first opportunity of testing the value of this procedure in a case, with little vomiting or purging, found collapsed in the garden. This man was pulseless when first seen one evening, and all that night and next day. He was not transfused as the circumstances made it extremely difficult to do so. He recovered.

As the condition of this patient was as grave as I have ever seen, it is possible that the saline as well as the antiseptic treatment may have been of benefit. The disease had a big start and I never expected the patient to recover.

The whole essence of this treatment is that the quantity of antiseptic given is lessened gradually in concentration and frequency of dosage as the symptoms subside, and to do this to the best advantage is a question of nicety of clinical judgment.

In those cases in which the pulse has not completely disappeared I look upon its condition as the most reliable indication. I have seen cases in which, improvement having occurred, the cresol has been lessened too quickly with symptoms of relapse and increasing weakness of the pulse, rapidly checked by an increase in cresol dosage.

As the symptoms subside small quantities of tepid water at frequent intervals are given in the increasing intervals between cresol administration. At this time, however, the stomach is often very irritable, and even plain water is often rejected, but in such cases good may be done by washing the stomach free of its last trace of toxic material, though it is of course desirable to avoid much vomiting.

A sign which I regard as very favourable is to recognise in some of the last motions passed a slight milky appearance due to cresol. It is a sign that from beginning to end the bowel has been irrigated with antiseptic lotion.

During the stage of collapse, three to eight minims of solution or adrenalin chloride, 1 in 1000 may be given hypodermically or intramuscularly every two hours, or slightly more often if necessary. In marked cases of collapse camphor, one-quarter to one grain, according to age, may be given in a similar manner. In most cases in an adult however, I prefer to give half a grain of camphor and repeat in half an hour if necessary, no further dose to be given under two hours.

When the first shock is past and the patient on the road to recovery, occasional motions may be passed of clear, glairy mucus like

unboiled white of egg with minute brownish-black specks in it. By the time this has appeared, the libations of tepid water which gradually replaced the cresol solution are replaced in their turn by alkaline water, and the patient encouraged to drink freely of tepid water containing a teaspoonful of sodium bicarbonate and a minute pinch of salt in a pint.

Nothing but water so treated should be given for twenty-four hours after the acute symptoms have subsided.

Feeding may then be very cautiously begun with, for an adult, a dessertspoonful of arrow-root or powdered rice boiled with water and strained given twice daily.

On the following day the powdered rice may be left unstrained, and a little albumin water tentatively added, and, if no harm ensues, a small quantity of milk may be given next day and gradually increased.

At this stage carminatives are of value in relieving the flatulence and soreness of the empty bowel, and bicarbonate of soda is also indicated for relief of gastric discomfort and as a check to acidosis.

I regard this care in dieting as of great importance.

Into general considerations, application of warmth in collapse stage, etc., I shall not enter. I believe everyone is in agreement upon these points.

The cresol is still continued, two or three minims in water twice daily, to lessen the tendency to carrier formation. Observation of one case in which recrudescence of symptoms occurred on the second day, leads me to believe that if the disease has been quickly checked by cresol administration, the amount of toxin absorbed is not of sufficient amount, or (more likely) acting for a sufficient time, to produce an appreciably high antitoxic content of the blood, and in such cases recrudescence may occur. The remedy is to increase for a time the dose of cresol.

One should, therefore, only add albumin to the dietary very cautiously, as it is such an excellent culture medium.

The second reason for scrupulous care in the after-dieting is that the epithelium of the bowel over considerable areas must be denuded or devitalised, and unable to carry out its vital functions.

I have a record of three children who had apparently recovered from cholera under cresol treatment, and whose vomiting and diarrhoea had completely ceased, whilst urine had been passed in quantity and the heart exhibited no sign of weakness.

The parents gave them on the third day a meal of curry and rice, and all died within a few hours. There is little doubt that dieting for some days after a cholera attack must be carried out with great care.

I have recently seen four cases in which marked cerebral symptoms occurred following the stage of collapse, the patients not regaining true consciousness. All were females, two adults, two young girls. Of these the two adults died of pneumonia on the fifth and sixth days of illness respectively.

Though this condition is generally supposed to be uræmic, I was much struck by the marked resemblance in symptoms to cases of cerebral irritation following head injuries. In only one of the cases was I able to obtain any urine for examination, and it did not contain any albumin, though the peculiar cerebral condition had only slightly improved at the time. I would hazard the suggestion that some of these cases may be, partly at least, due to a transient injury of the cortical cells caused by minute thrombi or by partial failure of the circulation during the stage of collapse.

Observation of the two fatal cases also inclines me to the opinion that the terminal pneumonia was an inhalation one, due to fluid entering the lungs in the attempt to feed them in their semi-conscious condition. One of the children which recovered was fed by a nasal tube from the outset for almost a week. Of the two fatal cases, one was fed by tube but, I fear, too late. The relatives of the other refused this treatment.

I would suggest that tube feeding be resorted to from the outset in all such cases.

An analysis of cases shows a total of 61 treated by this method with 12 deaths, giving a mortality of 19.6 per cent. This total includes a series of 27 cases this year on one garden in which I was able to closely supervise the treatment. This series had four fatal cases, a mortality of a shade under 15 per cent.

The diagnosis in every case had to be made on clinical grounds, but was only made after a strict examination. A large number of cases of diarrhoea occurring when cholera was present on a garden, and quickly yielding to cresol treatment, have not been included, though a goodly proportion were in all probability cholera.

Many of the patients had no perceptible pulse when first seen, a large number of these recovered.

Whether the treatment will prove more efficacious than that recently introduced by Dr. Tomb, only time will show. I believe it will certainly not prove less efficacious, and it is cheaper.

There is a clinical variety of what appears to be a kind of bacillary dysentery, in which collapse occurs with passage of fluid motions resembling chopped up white of hard-boiled egg in a slightly pink tinged milky fluid. In these cases, which appear to be a clinical entity and which might conceivably be mistaken for cholera, the effect of cresol appears specific.

I have recently had the opportunity of trying cresol in a small outbreak of the most severe bacillary dysentery I have ever seen, probably a Shiga infection, with most satisfactory results

A word as to the brand of cresol used. Cresol is a mixture of meta-, para-, and ortho-cresols derived from crude carbolic acid. This mixture constitutes cresylic acid, but it is probable that various preparations contain varying amounts of the three constituents. These various preparations masquerade under different names, and are emulsified in different ways. Some of these preparations I have seen are highly unsuited for internal use and seem to me to consist chiefly of crude carbolic acid. It is stated that para-cresol is a powerful poison.

A good variety of cresol for internal use should be thoroughly miscible with cold water, producing an emulsion resembling much watered milk. No globules, however minute of tarry fluid should remain in suspension, this being generally a characteristic of the inferior brands. The preparation in other words should make a perfect emulsion.

It should have a slight not unduly pungent tarry taste but should not taste at all of carbolic acid.

Preparations forming a thin watery, very slightly milky fluid, should not be used internally. These are generally of the crude carbolic type.

I have used preparations of phenyl which conformed to these conditions and seemed quite suitable, but the great majority of the cases whose treatment is outlined in this paper have been treated by a brand called "Sanitol" which seems very suitable. I do not know the maker's name.

I expect Cyllin and medical Izal would prove equally suitable.

I hope that this paper will induce others to try a method of treatment which seems to me very promising, and which, if carried out carefully and when experience has been gained, will, I believe, reduce the mortality of cholera to well under twenty per cent, and that with a simplicity of treatment suitable to the conditions under which cholera so frequently occurs amongst Indian labour and villages.

Should the conditions be more favourable, a combination of some such treatment as this with transfusion or some other method of introducing fluid, may hereafter be found to be the ideal one.

*Postscript* (23rd June 1924) — Since writing the above paper, within the past month or so 87 cases have been treated by this method with 23 deaths, a case-mortality rate of 26.2 per cent.

For purposes of classification, these cases may be divided as follows —

(1) Collapsed cases, with pulse imperceptible when first seen. Of these, there were 24 such cases with 12 deaths, a mortality of 50 per cent.

(2) Semi-collapsed cases with pulse extremely weak and thready, but perceptible when first seen. Of these there were 36 cases with 11 deaths, mortality 30.5 per cent.

(3) Cases with no collapse. Of these there were 10 such cases with no death and no mortality.

Increasing experience shews the necessity of persevering with the treatment even when a weak pulse to begin with is followed by complete collapse after treatment has been begun. It also shews the necessity for not lowering the amount and frequency of cresol administration too quickly, in such cases a transient return of the pulse may be followed by fresh disappearance of a most insidious character, with perhaps no further vomiting or diarrhoea. I now continue administration at two-hourly intervals on the day after the attack and at three or four-hourly intervals the day following that — F. J. P.

## ON SPIDER-LICK, A DERMATOZOOSIS \*

By C. STRICKLAND, M.A. (Cantab.)

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THE popular notion of the ætiology of the condition called spider-lick stands naked and unashamed in its title and is expressed in the following citation from a letter to the writer, — "for a long time we thought it must be due to some sort of cobweb flying about in the air." The inoffensive spider, which in India at any rate is man's friend, has been "arraigned" on false evidence and convicted of battery and assault. Nevertheless by the same token the specificity of the condition has been well recognised,† pathologically it is an escharmosis which may proceed to destruction of the dermis.

Clinically it is of some importance, as troublesome and perhaps alarming sores develop, sometimes very severe, and it in the neighbourhood of cellular tissue considerable swelling may result, or serous membranes may be involved, as for instance the conjunctiva (*see* Plates I and II) and great injection ensues. In some parts of India — in Assam for example — the complaint is very common.

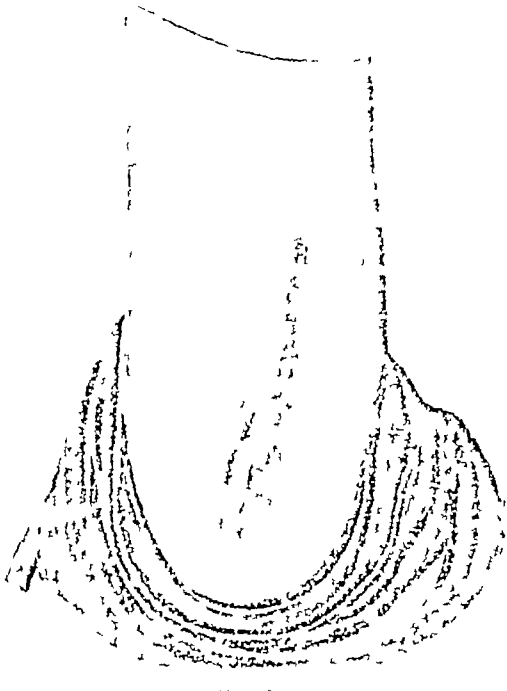
But some intuitive minds have revolted against the popular notion of the spider connection. Thus Mr. Duff of Messrs. Bird & Co., Calcutta, and General Manager at Raipur in Gangpur State (Orissa), suspecting a certain insect, "tried two on his arm and after 3 or 4 days both 'took,' resulting in very nasty sores which took some time to heal." Then a lady patient of Dr. Ramsay's at Labac, Cachar, who had suffered herself was convinced, correctly as it turned out, that an 'insect,' specimens of which she sent, was the culprit, and similarly some of Dr. Norrie's patients at Naihati have considered that the trouble was caused by an insect well known to them in all but name. Moreover similar lesions have been recognised by officers on duty in the jungles on the Bombay side as being caused by 'blister-beetles.'

\* Being a paper read at the Medical Research Section of the Indian Science Congress, 1924.

† "One Indian doctor however described it as 'bad eczema.'" How often when a misdiagnosis is made, is the epithet 'bad' attached to it.

Dr Ramsay himself has reported that the condition conforms to the text-book descriptions of the dermatozosis caused by 'blister-beetles,' but that he had tried to produce vesication through the agency of many of the numerous beetles prevalent in the locality without success

PLATE I



The medical profession has of course been long cognisant of the vesicating power of certain families of beetles, the best known of course being the *Cantharidae* to which the Cantharid beetles,

PLATE II



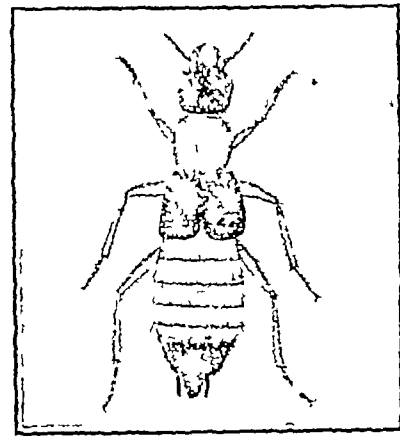
or *Epicauta* species belong, these families being grouped by Physalix (1920) into *Coleopteres vesicants* and *Coleopteres bombardiers*

The chief families among the bombardiers are the *Staphylinidae*, *Carabidae*, and *Dytiscidae*. Species in the former group secrete a vesicating fluid from a gland in the neighbourhood of the 'knee-joint,' while the *Coleopteres bombardiers* have pouch-like secretory glands opening on the pygidium, or last abdominal segment, and from them a fluid is thrown out *proie nata*, sometimes with great force (hence 'bombardiers') by the evagination of the secretory pouches. The fluid ap-

pears to be odoriferous and very volatile and is probably asphyxiant, the mechanism being defensive rather than offensive. Mr Duff describes how an insect behaved when "placed with a flying-ant. A great fight ensued and in a very short space of time the flying-ant was laid out, the beetle showed remarkable footwork and the 'knock out' appeared to be done with its tail"—(N.B. where the glands lie)—"the insect darting in and out with great rapidity."

The Staphylinids in England are commonly known as Devil's coachmen. They are relatively long and narrow, and would probably often be taken for earwigs from which however they can be distinguished by the absence of pincers at the posterior end. They are chiefly characterised by the shortness of the elytra (see Plate III) under which the membranous wings are folded in an

PLATE III



orderly fashion when in repose. The last abdominal segments are very mobile so that the tip of the abdomen can be almost bent over to touch its dorsal surface. In fact the vaginated pygidial pouches can touch the last articular membrane.

In India no species of Staphylinid has previously been connected with 'spider-lick,'\* but Mr Duff's specimens, sent by Mr Kirkpatrick of Messrs Bird & Co through Major Acton, I.M.S., which the writer first had the opportunity of seeing, were *Pederus fuscipes* of the family. This species was also sent by Dr Norrie (through Major Stewart, I.M.S.)

It is a species about 6 mm long and of a brilliant brown colour except for the elytra, head, and tail, which are azure blue (See Plate III).

The results of a few experiments carried out by the writer to establish its connection with the dermatitis were as follows—

1. On several occasions the insect was allowed to crawl freely on the skin of different persons, but nothing ensued.

2. On one occasion it was harried without being touched but nothing ensued.

\* However, *Pederus fuscipes* has been connected with a form of gastro-intestinal irritation (v. Castellani and Chalmers, 1919).

3 Experiment of 22-6-23 The same insect was rubbed on the arm of a volunteer 23-6-23 no lesion visible 24-6-23 a few small erythematous papules (See Plate IV) 25-6-23, some of the papules were vesicular

PLATE IV



4 Experiment of 4-7-23 A specimen of *P. fuscipes* was gently rubbed on the forearm of a volunteer with no after-effects 19-7-23, the same process was repeated with no results

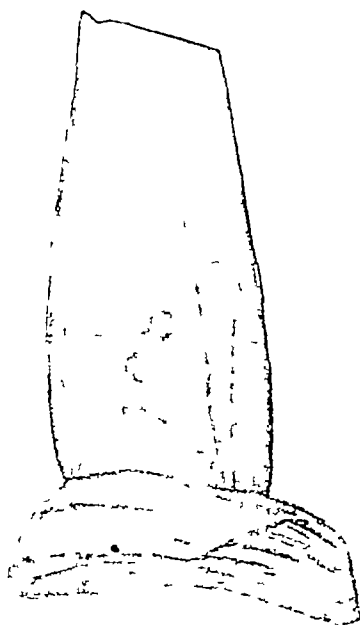
5 Experiment of 4-7-23 The specimen was rubbed on the arm of another volunteer in which case slight erythema resulted which lasted for two days

19-6-23 The alcoholic extract of about a dozen specimens of *P. fuscipes* which had been kept in the museum was painted on the arm of Dr Roy, the writer's assistant in the form of his name

20-6-23 No reaction observed

21-6-23 Erythema in the form of Dr Roy's name visible (See Plate V)

PLATE V



22-6-23 Papular and vesicular

24-6-23 Eruption started to fade and after ten days normal was reached

*Treatment*—The condition should naturally be treated with some emollient, or where much tumefaction has occurred in loose cellular tissue, by hot fomentations

*Prophylaxis*—This is a problem of some difficulty and must be based upon the biology of the insect. It would be difficult to prevent the access of the insect to the human subject for its long thin sinuous body enables it to crawl even through the meshes of a mosquito net, as the writer found to his discomfort recently when travelling by steamer in the Assam Valley. The insect is strongly attracted by light and doubtless when it is very prevalent, it would be useful to have a decoy lamp in a suitable position. Perhaps an insecticide of some sort would be effective, but as culicifuges even against worse enemies have not much vogue it would not do much good to recommend them.

The writer hopes at a later date to be enabled to study the breeding grounds of the species and some more practicable suggestion may thereby emanate. This year, when the clinical observations had been completed, it was impossible to obtain any further supplies of the insect.

*Epidemiology*—Spider-lick evinces itself in seasonal outbreaks. In Bengal they appear during the hot dry months, and subside on the advent of rains. In Assam it is reported that the season lasts from October to April and certainly the writer saw swarms of these insects in the Assam Valley early in the month of October, but he saw very few under the same conditions in November.

Coolies on tea gardens never seem to be attacked and this may be due to the fact that they do not have bright lights in their *bustees* at night as do Europeans in their homes. The general evidence goes to show that the insect is not prevalent during the rains or in the coldest months and these seasons separate two periods during which spider-lick may occur.

#### SUMMARY

'Spider-lick,' one of the minor horrors of India, is a common, troublesome affection of the skin occurring at different periods of the year, and is caused by *Poderus fuscipes*, one of the Staphylinid beetles.

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#### THE GLOBULIN CONTENT OF THE SERUM IN KALA-AZAR

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It is a well-known fact that normal blood is absolutely laked by the addition of the hæmolytic agent and the hæmolytic agent of the corpuscular spongio

that we get a perfectly clear and transparent fluid. But the most prominent feature noticeable in the blood in kala-azar is the fact that instead of a clear transparent solution, a distinctly turbid fluid is obtained when distilled water is added to it. The turbid solution on keeping gives a flocculent precipitate which gradually settles down to the bottom. This turbidity, as discussed in a previous paper (1), was found to be due to the presence of numerous shadow corpuscles consequent on some peculiarity in the serum.

Dr U N Brahmachari has found that the serum in kala-azar gives a white precipitate on the addition of distilled water (2), and this he thinks to be due to globulin. H Wu of the Peking Union Medical College, while discussing my paper on the hæmolytic test in kala-azar (3) has shewn from the result of his estimations of globulin that it is definitely increased in this disease.

In normal blood serum there are two principal varieties of globulin—euglobulin and paraglobulin. Of these the euglobulin, being insoluble in water, is supposed to be the true globulin, whereas the other, paraglobulin, which is soluble in water, is called the pseudoglobulin. During the process of salting out it has been found that really there are two varieties of pseudoglobulin which come down at two different concentrations of the salt and hence they are termed pseudoglobulin I and pseudoglobulin II.

In the present work the total globulin content of both normal and kala-azar blood sera, as well as the quantity of the different globulins present, have been separately estimated.

The ideal method for the estimation of the different globulins would be to precipitate them separately, make them as pure as possible by the process of dialysis or ultrafiltration and estimate them gravimetrically in the dry state. But the practical difficulties of such an estimation, particularly when one has got to do a series of cases, are such that it is almost an impossibility, and we had therefore to have recourse to the method of estimating the nitrogen, and then calculating the values for the globulins therefrom. The principal nitrogenous constituents of the blood serum can be divided into two groups—proteins and non-proteins. Of these the protein substances are serum albumin and serum globulin. Serum globulin again is further subdivided into three varieties, viz., euglobulin, pseudoglobulin I and pseudoglobulin II. The nitrogenous but *non-protein* substances are urea, uric acid, creatin (?), creatinin, ammonium salts, etc. It is thus obvious that the value for the total nitrogen of the serum would represent the protein as well as the non-protein nitrogen. If now we precipitate all the proteins from the serum, and then estimate the nitrogen of the filtrate we get the value of the non-protein nitrogen of the serum. Similarly, if we precipitate all the globulins and estimate the nitrogen of the filtrate we get the value of the

nitrogen due to serum albumin and non-protein substances.

The total value of the nitrogen due to the three varieties of globulins is obtainable by subtracting the sum of the value for the non-protein nitrogen and serum albumin nitrogen from the total nitrogen of the serum.

The total nitrogen of the sera was estimated by the Kjeldahl process.

The non-protein nitrogen was ascertained by finding out the nitrogen of the filtrate after precipitating all the different proteins by trichloroacetic acid or tungstic acid, and that for the globulins by the use of different precipitants, e.g.

- (1) half saturation with ammonium sulphate,
- (2) complete saturation with magnesium sulphate,
- (3) 21.5 per cent solution of anhydrous sodium sulphate.

1. Ammonium sulphate in its half saturated solution is a well-known precipitant of the globulins and it is this salt that was first tried, but unfortunately the precipitant itself contains nitrogen, and so first of all one has got to eliminate that before one can estimate the nitrogen of the filtrate. It is such a cumbersome process that with the greatest possible care I could succeed in a few cases only, and failures became so common that I had to give up this process altogether and try the next one.

2. Diluted serum when completely saturated with magnesium sulphate precipitates all globulin. This method gave very satisfactory and consistent results, and most of the earlier estimations were done by using magnesium sulphate. Control experiments were done in a few cases by using both ammonium and magnesium sulphates with very little difference in results.

3. The next method that was tried and which was found to be the best was with sodium sulphate (4), and most of the results that are published in this paper have been obtained by following this method. This salt at a 21.5 per cent concentration precipitates all globulin that is present in the serum. The most important point to be observed during the precipitation is that it should be carried out at 37°C.

Several control tests were done where all the three different methods were tried on the same sample blood serum. Table I shows that the results for all practical purposes do not differ much and that the little differences that exist are not much beyond what can be explained by experimental error.

It has also been found by Paul E. Howe that if blood serum be treated with gradually increasing quantities of sodium sulphate at 30°C, there are three critical zones where maximum precipitation occurs. We have already seen that at a concentration of the salt between 21 to 22 per cent all the globulins in the serum are thrown out, and the values are the same as those obtained by saturating with magnesium sulphate or with half saturation with ammonium sulphate. Another critical

TABLE I

Showing the Nitrogen content of the filtrate after the separation of globulin from the serum by different methods

Ammonium Sulphate	Magnesium Sulphate	Sodium Sulphate
0.42	0.434	0.425
0.252	0.27	0.28
0.728	0.714	0.7
0.397	0.406	0.385
1.05	1.01	1.02

zone was found at 13.5 to 14.5 per cent concentration of sodium sulphate. The globulin that is precipitated at this concentration of the salt corresponds to that which is obtained by distilled water and carbon dioxide, and also to that obtained by saturation with sodium chloride. From these observations it is evident that the euglobulin fraction comes down at a 13.5 to 14.5 per cent concentration of the salt, and the rest are precipitated at the critical zone of 21.5 per cent. It has further been found that there is another critical zone at 16.4 to 17.4 per cent concentration of sodium sulphate. This shows that besides the euglobulin there are two other pseudoglobulins termed pseudoglobulin I and pseudoglobulin II, which can be salted out at different concentrations of the salt.

**Technique**—Blood is drawn from the vein and allowed to clot in a dry centrifuge tube. In kala-azar about 10 cc. are sufficient for all these estimations, but in a normal case a little more is necessary. The reason is that whereas in a normal case the relation between the corpuscles and the plasma is approximately as 49 : 51 in kala-azar where there is more or less marked anemia particularly when the kidneys are involved, the relationship between the corpuscles and the plasma is much changed the corpuscles even going down to 12 to 14 per cent. On its complete coagulation the blood is centrifugalized and a clear serum is obtained.

From this—

(1) 0.5 cc. of the serum is put up for the estimation of total nitrogen by Kjeldahl's process.

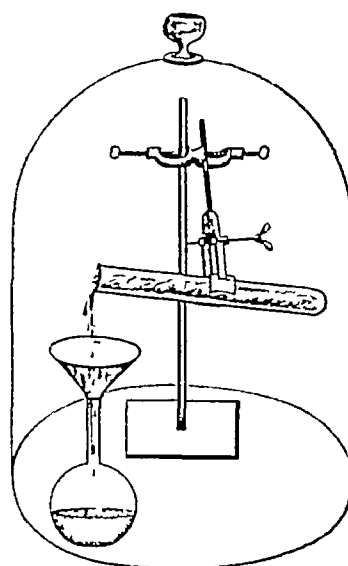
(2) 1 cc. of the serum is diluted with 7 cc. of distilled water to which is added 1 cc. of 10 per cent sodium tungstate solution and 1 cc. of 2/3 N sulphuric acid. After mixing thoroughly it is filtered through a dry filter paper and an aliquot part, say 5 cc. of the filtrate representing 0.5 cc. of the serum is put up for the estimation of the non-protein nitrogen by Kjeldahl's process.

(3) Three 20 × 200 mm test tubes are taken and 30 cc. of 14 per cent, 18 per cent and 22.2 per cent solution of anhydrous sodium sulphate are put into them respectively. To each of them 1 cc. of the serum is added and thoroughly mixed. All three are then kept in the incubator at 37° C. After about an hour the precipitate settles down and is ready for filtration. Rubber caps are to be put on to prevent any loss of evaporation, especially if the tubes have to be kept overnight.

The process of filtration is a rather difficult one. The precipitate being very fine passes through the filter

paper, and unless the solution is passed several times through the same filter paper it is almost impossible to get a clear satisfactory filtrate. This not only takes a very long time and needs constant attention, but also causes loss of the fluid by evaporation, thus altering the concentration of the salt. To obviate this difficulty the following procedure was adopted with quite satisfactory results. A thin, and long piece of absorbent cotton is taken, and washed thoroughly with distilled water. It is then squeezed practically dry, and pressed between several folds of blotting paper. It is then slowly introduced into the solution taking care not to disturb the precipitate at the bottom of the test tube. The tube is then fixed up in an inclined position and the cotton acting as a wick draws up the fluid by capillary action, which then drops slowly from its protruding and free end, and collects in another test tube with a funnel on. The whole thing is placed under a bell-jar to prevent any loss by evaporation. In about 15 minutes' time an absolutely clear filtrate can be obtained in sufficient quantity.

PLATE I.



An aliquot portion 15.5 cc representing 0.5 cc. of the serum is taken from each of the three different tubes and the nitrogen estimated separately by Kjeldahl's process.

As the result of the estimations, the following results are calculated for the serum—

1 Total nitrogen = Protein nitrogen + non-protein nitrogen

2 Protein nitrogen = Total nitrogen — non-protein nitrogen

3 Non-protein nitrogen = Nitrogen in filtrate from tungstic acid precipitation

4 Serum albumin = Nitrogen in filtrate from 21.5 per cent precipitation — non-protein nitrogen

5 Serum globulin = Total nitrogen — nitrogen in filtrate from 21.5 per cent precipitation

6 Euglobulin = Total nitrogen — nitrogen in filtrate from 13.5 per cent sodium sulphate precipitation

7 Pseudoglobulin I = Nitrogen in filtrate from 13.5 per cent sodium sulphate precipitation, — nitrogen from 17.4 per cent sodium sulphate precipitation

8 Pseudoglobulin II = Nitrogen in filtrate from 17.4 per cent sodium sulphate precipitation, — nitrogen in filtrate from 21.5 per cent sodium sulphate precipitation

From the tables given it will be seen that in kala-azar, though the total amount of the serum

proteins does not vary much from normal, the globulins are much increased (Table II). All the different globulins that are present in the serum are found in a more or less higher percentage than in the normal controls. But the most pro-

And euglobulin being insoluble in distilled water, it seems to be responsible for all the different blood tests in kala-azar. It is particularly so for the globulin test of Dr. Brahmachari and the hemolytic test of the author. It has been sug-

TABLE II

*Showing the results of analysis of the serum in kala-azar and normal control cases*

The results are given in grammes of nitrogen for 100 c.c. of the serum

	Serum	Serum non-protein	Serum protein	Serum albumin	Serum globulin	Euglobulin	Pseudo-globulin I	Pseudo-globulin II	REMARKS
Case 1	1.34	0.028	1.312	0.252	1.06	0.5	0.392	0.168	L. D. bodies present in spleen smear. Hemolytic and aldehyde reactions positive.
Case 2	1.16	0.028	1.13	0.432	0.7	0.26	0.35	0.09	L. D. bodies on spleen puncture. Hemolytic and aldehyde reactions positive.
Case 3	1.38	0.042	1.346	0.12	1.22	0.716	0.336	0.148	L. D. bodies found.
Case 4	0.924	0.056	0.868	0.308	0.560	0.308	0.224	0.028	L. D. bodies found on culture. Hemolytic test positive.
Case 5	1.25	0.028	1.22	0.352	0.88	0.38	0.57	0.129	Spleen smear shows L. D. bodies.
Case 6	1.225	0.049	1.176	0.56	0.616	0.28	0.168	0.168	L. D. bodies found on culture. Hemolytic test positive.
Case 7	1.074	0.056	1.018	0.434	0.584	0.294	0.196	0.086	L. D. bodies on spleen puncture. Hemolytic and aldehyde reactions positive.
Case 8	1.32	0.028	1.29	0.252	1.03	0.4	0.35	0.28	Spleen smear shows numerous L. D. bodies.
Case 9	1.04	0.035	0.99	0.375	0.62	0.38	0.168	0.072	L. D. bodies found on blood culture. Hemolytic test positive.
Case 10	0.868	0.056	0.812	0.252	0.56	0.308	0.224	0.028	L. D. bodies in spleen smear. Hemolytic and aldehyde reactions positive.
Control	1.15	0.028	1.122	0.7	0.42	0.03	0.392	0	Normal
Control	1.104	0.042	1.162	0.658	0.504	0.025	0.389	0.09	Normal
Control	1.092	0.028	1.064	0.588	0.476	0.04	0.408	0.028	Normal
Control	1.09	0.035	1.057	0.805	0.252	0.03	0.22	negligible	Normal

minent feature in the increase is that the euglobulin is the one which is most markedly increased (Table IV). In normal conditions it will be seen from the table that euglobulin constitutes 7 to 8 per cent of the total globulin present, whereas in kala-azar it constitutes from 40 to 50 per cent

suggested by different workers that the hemolytic test is entirely due to the precipitation of the globulin, and that the hemolysis is not interfered with in any way. In another paper I shall give the result of my investigations on the point and the conclusions arrived at. In the course of this



TABLE III

Showing the proportion of the serum albumin and the serum globulin as found in kala azar cases and normal controls

The figures are in grammes per 100 cc of the serum

	Serum protein	Serum albumin	Serum globulin
Case 1	8.1	1.575	6.625
Case 2	7.06	2.7	4.37
Case 3	8.37	0.75	7.62
Case 4	7.62	2.2	5.5
Case 5	7.51	3.5	3.85
Case 6	8.06	1.575	6.44
Case 7	6.31	2.71	3.65
Normal control	7	4.34	2.62
Normal control	7.25	4.11	3.15
Normal control	6.62	3.67	2.97

TABLE IV

Showing the relation of the euglobulin fraction to the total globulin present in kala azar cases and in normal controls

	Serum globulin	Euglobulin	Per cent of Euglobulin in total globulin
Case 1	6.62	3.12	47.28
Case 2	4.37	1.62	37.07
Case 3	7.62	4.47	58.66
Case 4	5.5	2.37	43.09
Case 5	3.85	1.75	45.45
Case 6	6.44	2.5	38.81
Case 7	5.5	2.37	43.09
Normal control	2.62	1.87	71.4
Normal control	3.15	0.16	5.07
Normal control	2.97	0.25	8.41

investigation I had occasion to analyse sera of different pathological conditions other than kala-azar and incidentally I may mention that in syphilis also the globulin content is much increased, but though the euglobulin fraction shares in the general increase it is never so much increased as is the case in kala-azar. Another interesting fact is that in all conditions of leishmaniasis the

blood-changes are not the same. I was fortunate enough to obtain the blood of a case of oriental sore in which numerous *Leishmania tropica* were found, and the result of the analysis shows that it does not vary much from the normal.

My thanks are due to Lieutenant-Colonel F. A. F. Barnardo, FRCS, FRCPE, CIE, CBE, IMS, and Major J. A. Shortt, BA, MB, BCh, MRCP (Lond.), Professor of Physiology, for giving me all possible facilities both in the laboratory and in the hospital wards in carrying out this work. My thanks are also due to my colleagues for the valuable help I have received from them throughout this investigation, and especially to Drs. Suresh Chandra Chandra, BSc, MB, and B. N. Persad, MSc, MB, DTM, who helped me materially by preparing some of the various reagents and actually carrying out some of the experiments. I desire also to take this opportunity to express my indebtedness to various students of the Medical College for their volunteering to give their blood as normal controls.

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## UREA-STIBAMINE IN THE TREATMENT OF KALA-AZAR UNDER TEA GARDEN CONDITIONS

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SINCE the introduction of urea-stibamine by Dr. Brahmachari in 1922, the published reports of the use of this drug in kala-azar by Brahmachari (1922) and Shortt (1923) have been most favourable. As, however, these reports all referred to cases treated in hospital under the most favourable conditions, I was asked by Major Shortt, IMS, to utilise the drug supplied to him by Brahmachari for experimental purposes, in the treatment of kala-azar cases under ordinary tea garden practice conditions. In this way the suitability of the drug for use under conditions parallel to those under which antimony tartrate had succeeded would be established or otherwise.

From 1916 to the end of 1923 over 850 cases have occurred on two neighbouring gardens under my supervision. These cases represent two separate epidemics following on one another. *Doorin Garden* with a total of 504 cases from 1916 to 1923, shewed the greatest incidence in 1917-18, 348 of the cases having occurred in these two years.

*Hautley Garden* had a total of 343 cases from 1921 to 1923 fairly evenly distributed over this period. At the present time, as the result of continually applied and strictly enforced measures

Table showing details of 20 consecutive cases treated with Urea-Stibamine

No	Spleen or liver bodies for L.D.	Sex	Age	Duration of present illness	No of injections given	Size of spleen prior to treatment in lbs	Size of spleen at the end of treatment	Proof of cure	Previous treatment in grams	Weight on admission, lbs	Weight on discharge, lbs	Total amount of Urea-Stibamine in grammes	REMARKS
1	Plus	M	5	2 months	5	3½	3	Spleen punc negative	15	37½	39	0.41	
2	"	M	7	1 month	10	4½	3	"	135	36½	37½	1.17	Fever stopped after second injection
3	"	F	29	2 months	8	4½	N	"	Nil	60	70	1.50	Fever stopped after second injection very rapidly reduced in size
4	"	F	38	"	6	5	N	Clinical	"	75	80	1.20	Apparently a very early case
5	"	M	21	15 days	5	2½	N	"	"	76	79	0.95	infected
6	"	F	6	2 months	18	4	2	Spleen punc negative	15	38	39	2.20	Relapsed case
7	"	M	7	1 month	12	4	N	"	135	40½	42	1.35	Relapsed case
8	"	F	6	1 week	4	1½	N	Clinical	Nil	25	26½	0.35	An early case
9	"	M	32	2 months	14	7½	Much reduced	Spleen punc negative	"	88	90½	2.10	Patient originally admitted for dysentery
10	"	M	28	3 "	10	5	N	Clinical	"	105	111	2.15	Fever stopped after second injection
11	"	F	34	2 "	10	4	3	Spleen punc negative	25	84½	85½	2.15	Spleen very rapidly reduced
12	"	M	34	7 days	10	3	N	Clinical	Nil	110	125	2.15	Palpable only after fifth injection
13	"	M	35	15 "	10	5	3	Spleen punc negative	"	94	96	2.05	Relapsed case
14	"	M	24	14 "	11	5	N	Clinical	"	97½	99	2.45	An early case
15	"	M	41	1 month	14	5	3½	Spleen punc negative	"	95	96	3.20	An early case
16	"	M	35	1 "	11	3	2	Died	"	73½	38	2.25	Extremely rapid reduction of the size of spleen during treatment
17	"	M	9	12 months	21	6	4	Spleen punc negative	"	34½	38	2.96	
18	"	F	38	6 "	13	5	2	"	"	88½	92	2.95	Died
19	"	M	38	3 "	10	5	2	"	"	82	93	2.20	Fever stopped after second injection
20	"	M	49	1 month	8	2	N	Liver punc negative	"	84	91	1.70	Admitted with dysentery

of prevention and treatment the condition of both gardens is normal, and any but sporadic cases have ceased to occur

**Dosage**—The dosage used was that recommended by Shortt (1923) with suitable variations for the younger patients

**Intervals of dosage**—The drug was administered intravenously, the patients receiving their injections sometimes twice, at other times thrice weekly, the interval depending on the days I was able to visit the garden. In one case only was any marked intolerance noticed by me. In this case there was vomiting, faintness, swelling of the lips with a burning sensation over the whole body occurred, coming on directly after the injection had been given, but very quickly passing off. Three days previous to this injection the spleen had been punctured with a negative result

**Total amount of drug given**—This varied in each case, administration being continued until the patient was considered cured, a negative result to splenic puncture being chiefly relied upon, and only six of the cases being discharged on clinical grounds alone

With some of the cases I admit the dosage has been very small, but all cases are under regular supervision and regularly inspected by me and up to date none of the cases has shown any signs of relapse

**Progress of cases during treatment**—The rapidity of the diminution of the size of the spleen was most marked in a very large percentage of the cases. The manner in which the fever was checked after the second injection was also a point well illustrated in a large number of the cases. The patient who died, Case No 16, weighed on admission only 73½ lbs and had chest complications before treatment was commenced, the second injection being omitted owing to this. With further treatment, at first his chest condition seemed to improve, but after the patient had received a total dosage of 200 gm the temperature shot up to 103° F, tubular breathing and rhonchi were present, the patient became delirious, and died, his peripheral blood showing leucocytosis only

**Analysis of the table**—None of the cases were selected, all new admissions since October 1923 being given urea-stibamine

**Duration of present illness**—A number of cases were received at an early stage, owing to the fact that all contacts are being regularly inspected

**Size of spleen prior to treatment**—This was measured by the number of fingerbreadths it extended below the costal margin

**Weight on admission and discharge**—No special value can be attached to this point owing to the short duration of the treatment, but all cases have been recently inspected and show a marked improvement in general health and have increased in weight

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### A SIMPLE METHOD FOR DETECTING AND ESTIMATING INDICAN IN THE URINE BY MEANS OF THE COTTON-WOOL PLUG TEST\*

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INDICAN is derived from indol, and unlike the other ethereal sulphates which are derived in part from metabolism originates practically wholly from putrefactive processes. It, alone, therefore, and not the total ethereal sulphates, has been taken as an index of such putrefaction(1)

The determination of indican depends upon its decomposition and oxidation of the liberated indoxyl into indigo-blue, and of the methods based on this principle, Obermeyer's test is in general use. This test is carried out by mixing an aliquot portion of urine with an equal volume of Obermeyer's reagent † and shaking the mixture with a few c.c. of chloroform which on standing sinks to the bottom and becomes blue. Normal urines—i.e., those containing traces of indican—impart a very faint blue to the chloroform, while in marked indicanuria the chloroform becomes deeply blue. The depth of the colour is proportional to the amount of indican contained in a sample of urine, and this fact is often made use of for an approximate estimation of the amount of indican by using the colour of Fehling's solution as a standard(2)

Obermeyer's test, though fairly simple in execution does not meet all the requirements of a routine test, and until such a test is available indican may continue to be tested irregularly as at present, and probably so long will its true significance, if any, remain undetermined. It was, therefore, interesting to find that during an investigation regarding the scope of the applicability of the cotton-wool plug test(3)—primarily devised by the author for applying Ehrlich's reaction to the sputum to a variety of other materials,—urine was found to respond positively to this test, and in view of the fact that the technique of this test, compared with that of Obermeyer's, is simple,

\* Being a paper read at the Medical Research Section of the Indian Science Congress, 1924

† Strong hydrochloric acid containing 0.2 per cent. of ferric chloride

delicate and economical both in the time and the reagents required to carry it out, experiments were instituted to find out the extent to which the cotton-wool plug test could replace Obermeyer's for the determination of indican in urine

The first point that required elucidation in such an inquiry was to ascertain whether the results obtained by these two tests corresponded qualitatively, and for this comparative study the following procedures were adopted for their application to urine

**Cotton-wool plug test**—2 cc of urine was put in a small test tube (5 in by  $\frac{3}{4}$  in) which was fitted with a plug made of white absorbent cotton-wool. The plug was removed, its under surface moistened with a drop or two of the potassium persulphate and the p-dimethylbenzaldehyde solutions,\* and replaced. The urine was then boiled intermittently for about a minute

**Obermeyer's test**—2 cc of urine was put in a small test tube (5 in by  $\frac{3}{4}$  in), 2 cc of Obermeyer's reagent added, well mixed, and the mixture allowed to stand for fifteen minutes. At the end of this period 2 cc of chloroform was added to the mixture, the mouth of the tube closed with the thumb, and the liquids gently inverted ten times

Under these standard conditions a number of samples of urine were examined and it was found (i) that there was not a single instance where the cotton-wool plug test failed to respond positively when indican was detected by Obermeyer's test, and (ii) that the intensity of the pink colour on the cotton-wool appeared more or less proportional to the depth of the blue colour in the chloroform

In view of these results, the next question was to decide upon a procedure by means of which the second finding could be verified and the cotton-wool plug test applied for quantitative purposes. In the absence of quantitative methods suitable for routine work, a few preliminary experiments showed that dilution tests would best meet the requirements of such a comparative study

Accordingly ten old samples of urine were secured, and four successive half-dilutions were made from each sample. Two cc of the urine and of the four dilutions were put in five test tubes, and two such sets prepared for each sample. One set was examined by means of the cotton-wool plug test and the other by Obermeyer's test. The results of these tests are given in Table I

\* Potassium persulphate 1 gm Distilled water 100 cc  
P-dimethylamido-benzaldehyde 1 gm, Absolute alcohol 95 cc, Concentrated hydrochloric acid 20 cc

Note—These two solutions are conveniently stocked in glass-stoppered bottles (Pattern T K)

TABLE I

Showing the results of the dilution tests

No of sample of urine	Un-diluted urine		$\frac{1}{2}$ dilution		$\frac{1}{4}$ dilution		$\frac{1}{8}$ dilution		$\frac{1}{16}$ dilution	
	C W P Test	Obermeyer's Test	C W P Test	Obermeyer's Test	C W P Test	Obermeyer's Test	C W P Test	Obermeyer's Test	C W P Test	Obermeyer's Test
1	+	+	+	+	0	0	0	0	0	0
2	+	+	+	+	+	+	0	0	0	0
3	+	+	+	+	+	+	0	0	0	0
4	+	+	+	+	0	0	0	0	0	0
5	+	+	+	+	0	0	0	0	0	0
6	+	+	+	+	+	+	+	+	0	0
7	+	+	0	0	0	0	0	0	0	0
8	+	+	+	+	0	0	0	0	0	0
9	+	+	0	0	0	0	0	0	0	0
10	+	+	+	+	+	+	0	0	0	0

From this table it will be seen —

(1) That all samples of urine responded positively to both the tests

(2) That the highest dilutions which so responded were found to correspond, though different samples did so in different dilutions as follows —

Nos 7 and 9 showed positive results in the undiluted samples only

Nos 1, 4, 5 and 8 showed positive results up to  $\frac{1}{2}$  dilutions of the samples

Nos 2, 3 and 10 showed positive results up to  $\frac{1}{4}$  dilutions of the samples

No 6 showed positive results up to  $\frac{1}{8}$  dilutions of the sample

The above results thus confirm the findings of the first series of experiments in the fact that urine contains a volatile chromogen which as determined by the cotton-wool plug test, is proportionate to the indican as determined by Obermeyer's test. The question regarding the nature of this volatile chromogen and how it is related to indican is under investigation and will be dealt with in a future communication. However, in view of the fact that this chromogen resembles indol in its response to Ehrlich's reaction in the cotton-wool plug test and has been found to be colorimetrically proportionate to the indican, an attempt has been made to ascertain whether the results of the dilution tests could be expressed in terms of the indol-equivalent of the indican

As the result of a comparative study with nine different methods of applying Salkowski's 'nitroso-indol' and Ehrlich's 'rose-indol' reactions for the detection of indol in bacterial

cultures, Malone and Gore found that the cotton-wool plug test best fulfilled the conditions of a routine test, and detected indol in as small concentrations as 0.0005 mg per c.c. of liquid(4). Accordingly, a few experiments were performed on 2 c.c. quantities of liquids containing varying concentrations of indol with the result that liquids containing on an average about 0.0005 mg of indol per c.c. were found to impart a faint but distinct pink to the cotton-wool, while liquids having lower concentrations failed to show any pink colouration. 0.0005 mg of indol per c.c. was, therefore taken as the minimum concentration in which indol could be detected by the cotton-wool plug test, and in order to express the results of the dilution tests in terms of mg of indol equivalent per c.c. of the urine, one had only to multiply the strength of the highest positive dilution by 0.0005, as shewn below.

If a sample of urine responded positively to the cotton-wool plug test only in the undiluted

portion was directly examined by the above procedure and the results thereof calculated in terms of indol. The other portion was subjected to distillation and 25 c.c. of distillate obtained in five lots of 5 c.c. each. Each of these 5 c.c. distillates was examined by the above procedure, the results thereof calculated in terms of indol, and added up. The residual urine left in the flask was also examined but gave a negative result. These experiments showed that the error between the indol-equivalent estimated directly from the urine and from its distillate did not exceed 5 per cent. The details of one of these experiments are given in Table II from which it will be seen that the indol concentration of the urine as estimated directly from the urine was 0.002 mg per c.c., while that from its distillate was 0.00195 mg per c.c.

On the basis of all the above results, the following procedures have been devised for the detection and the approximate estimation

TABLE II

*Showing the details of an experiment in which the 'indol equivalent' of the indican present in the urine was estimated by means of the Cotton-Wool Plug Test, directly from the urine, and indirectly from its distillate and residue*

		RESULTS OF COTTON-WOOL PLUG TEST APPLIED TO						Mg indol equivalent per c c of the undiluted liquid ob- tained by multiplying the strength of the highest dilu- tion by 0005	Mg of indol- equivalent pe c c of urine
		Undiluted liquids	Half dilutions of the liquids						
			$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$		
Distillates	Urine	+	+	+	0	0	0	$4 \times 0005 = 002$	002
	1st distillate	+	+	+	+	+	0	$16 \times 0005 = 008$	
	2nd    ,,	+	+	+	+	+	0	$16 \times 0005 = 008$	
	3rd     ,	+	+	+	0	0	0	$4 \times 0005 = 002$	00195
	4th    ,,	+	+	0	0	0	0	$2 \times 0005 = 001$	
	5th    ,,	+	0	0	0	0	0	$1 \times 0005 = 0005$	
Residual from the distillate		0	0	0				0	

state the indican-content of the urine would be expressed as 0.0005 mg of indol-equivalent per c.c.

If a sample of urine responded positively to the cotton-wool plug test in its  $\frac{1}{2}$  or  $\frac{1}{4}$  or  $\frac{1}{8}$  dilution, the indican-content of the urine would be expressed as  $2 \times 0.0005 = 0.001$  mg or  $4 \times 0.0005 = 0.002$ , or  $8 \times 0.0005 = 0.004$  mg of indol-equivalent respectively per c.c.

With the object of ascertaining whether the above procedure of estimating the volatile chromogen of urine by means of the cotton-wool plug test and expressing the results in terms of indol was capable of yielding approximately correct results, a few experiments were instituted in each of which 100 c.c. of urine was divided into two equal portions. One

of indican in urine. The methods of procedure are as follows —

#### *Detection of Indican by the Cotton-Wool Plug Test*

1 Put 2 c.c. of urine into a small test tube (5 in. by  $\frac{3}{4}$  in.) and fit it with a plug made of white absorbent cotton-wool.

2 Remove the plug, moisten its under-surface with a drop or two, first of the potassium persulphate solution and then of the p-dimethylbenzaldehyde solution, and replace it.

3 Bring the urine to the boil by intermittent heating in a low flame and if the urine contains indican, half a minute's or a minute's further such boiling, imparts a pink colour to the moistened under-surface of the plug. This colouration varies from a faint but distinct

pink to a deep pink according to the indican content of the urine. In the case of a negative result, i.e., absence of indican, no pink colour is seen on the cotton-wool.

#### *Estimation of Indican by the Cotton-Wool Plug Test*

Having ascertained that a sample of urine has responded positively to the cotton-wool plug test as described above, estimation of indican is effected by applying the above described cotton-wool plug test to one or several of a series of successive half dilutions of the urine as follows—

1 Measure 2 c.c. of urine into a 5 c.c. graduated cylinder, dilute it with water to 4 c.c. and mix well. From this half-dilution of urine pour out 2 c.c. into a test tube and test as above. If the test is negative, no further dilutions are made.

2 If the half-dilution gave a positive result, dilute the remaining 2 c.c. of the half-dilution in the measure glass to 4 c.c. and mix well. From the resulting quarter-dilution pour out 2 c.c. into a test tube and test as above. If the test is negative no further dilutions are made.

3 If the quarter-dilution gave a positive result, dilute its remainder to 4 c.c. and mix well. From the resulting eighth-dilution pour out 2 c.c. into a test tube and test as above.

In the case of a negative result, no further dilutions are made, whilst in the case of a positive result further dilutions are similarly made and tested. In fact, successive half-dilutions are required to be made until a positive dilution is succeeded by a negative one, and it is this positive dilution which is taken as the highest dilution in which the urine is said to respond positively to the cotton-wool plug test.

The quantitative results thus obtained may be expressed either (i) in terms of the strength of the highest dilution in which the urine responded positively to the cotton-wool plug test, or (ii) in terms of mg. of the indol-equivalent of indican per c.c. of the urine, this is effected by multiplying the strength of the highest positive dilution by 0.0005 as explained in the body of the paper. For example, in case a sample reacted positively in  $\frac{1}{8}$  as its highest dilution, the indol-equivalent of the indican present in the urine would be  $8 \times 0.0005 = 0.004$  mg. per c.c. of the urine.

Thus not only is the presence of indican in urine detected but an approximate estimate of its amount obtained as well, more simply, rapidly and economically by determining the volatile chromogen in the urine by means of the cotton-wool plug test than by Obermeyer's test. Further the cotton-wool plug test possesses an additional advantage in the fact that its results are not liable to be vitiated by the presence of iodine in the urine which imparts a pink colour to the chloroform in

Obermeyer's test and is only got rid of by further treatment of the urine with sodium sulphite.

*Note*—One point to be remembered while applying the cotton-wool plug test to urine is that a volatile product is being tested for, and it is, therefore, essential that the sample of urine should be examined within a few hours of its being voided.

#### SUMMARY

1 The detection of indican in urine is, as a rule, effected by its decomposition and oxidation of the indoxyl set free to indigo-blue, and Obermeyer's test which is based on this principle, is the one in general clinical use chiefly for the purpose of detecting and occasionally for the rough estimation of the amount of indican present in urine.

2 Obermeyer's test, though simple, does not meet all the requirements of a routine test, and consequently fails to be used routinely in clinical work. In this paper it has been shown that the cotton-wool plug technique devised by the author primarily for applying Ehrlich's reaction to detect indol in sputum, could also be used to determine indican in urine, and compared with Obermeyer's test has been found to be more simple, rapid and economical in the reagents required besides, being independent of the drugs taken by the patient.

3 Further, since the volatile chromogen in the urine responding positively to the cotton-wool plug test resembles indol in its reaction and is proportional to the indican as determined by Obermeyer's test a quantitative method based on dilution tests has been devised whereby the amount of indican present in urine can be approximately estimated and expressed in terms of its indol-equivalent.

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#### FIFTEEN CASES OF EXANTHEMATIC TYPHUS IN CALCUTTA \*

By UMA PRASANNA BASU,

L.R.C.P. M.B. M.R.C.P. (Ire),

Teacher of Medicine Calcutta Medical School and  
Visiting Physician to the School Hospital

BETWEEN the middle of November 1922 and the third week of January 1923, I saw 15 cases of exanthematic typhus in Calcutta.

#### GEOGRAPHICAL DISTRIBUTION

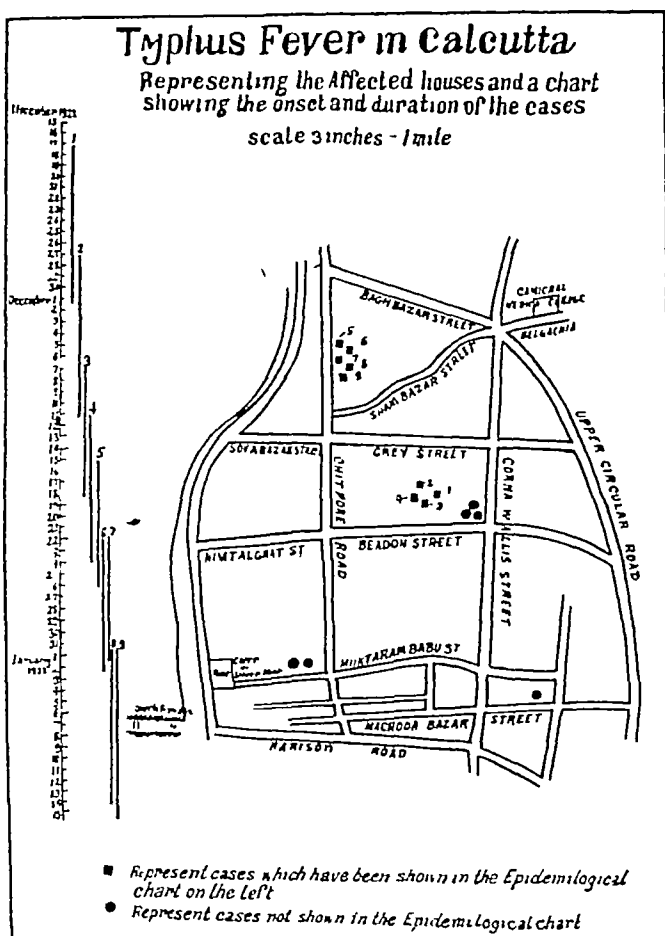
Although it is a disease of cold climates the domain over which typhus rules is far and wide. India regularly pays typhus her tribute. From the published accounts of this malady, we know that in India an endemic area exists in the north-east of the Punjab, including the trans-Indus

\* Read before the Calcutta Medical Club

districts, from Baluchistan to Eusutzan, Rawalpindi district and the Himalayan hill tracts, within which reports of various outbreaks have been described from time to time by Pisani, Vost, Hendley and others

In Calcutta this disease was first suspected by Dr Satva Saran Mitra, who in the years 1912 and 1917 read before the Calcutta Medical Club papers based upon his own observations on cases resembling typhus fever. Since then no further description of typhus fever in Calcutta has been published to my knowledge

1 *The period of invasion*—(From the onset of the disease right up to the appearance of the rash) The disease set in suddenly without any chill, except in two cases. Fever ranged between 101° and 103° F during the first 48 hours. There was headache from the beginning, the face was congested, the conjunctive injected, and the eyelids were tumified. There was slight throat cough, the tongue was coated and prostration appeared early, as the most playful child remained quiet in bed from the very beginning of the illness. The headache became aggravated as the



The majority of my cases were in children, and the clinical symptoms of this disease in my series differed fundamentally from those recorded by Dr Mitra, whose cases were mostly from among grown up persons

The geographical distribution of my cases was in Simla\* and Baghbazar, altogether 12 cases between 11 months and 12 years of age (17 in Simla and 5 in Baghbazar), 1 in Jhainapukur, 47 years of age and 2 in Burrabazar, one of whom was 20 and the other 63

#### CLINICAL DESCRIPTION

For the purpose of description, the disease, as studied by me, has been divided into three periods

disease progressed and about five or six times during sleep at night there was incoherent talk. There was usually constipation, and as the disease progressed the patient lay in bed in stupor, whilst when awake complaining of pains all over the body. On the third night, usually, the fever became high and the temperature shot up to 104°F with distinct chill in every case, this rise of fever was accompanied by delirium, which attracted the attention of the attendants. In most of the cases the marked anorexia which was present from the beginning gave place, about this time, to troublesome sickness

2 *The second period or the period of appearance of the eruption*—With this aggravation of temperature and delirium overnight the rash appeared, and became visible on the following

\* Simla is a portion of the city of Calcutta in the Northern side

morning In children the typical rash was heralded by an erythema of the skin which was prominent over the cheeks and was often mistaken for measles. It is this erythema which first attracts the attention of the physician who, when removing the clothing, first notices the scattered macular rash like mosquito bites distinctly visible through the generalised erythema, and chiefly seen round the armpits, over the shoulders, on the thorax, epigastrium and later on on the limbs and lower abdomen. At first these spots were reddish and seemed to disappear for the moment on pressure, later they took on a papular form, raised above the surface and not disappearing on pressure. They soon changed colour and assumed a livid bluish grey halo. They gave the impression as if the skin had suffered slight contusion at these points, slight but sufficient to produce tiny patches of ecchymosis which no longer disappeared under pressure. The size of the maculae also increased from that of a pin's head to the dimensions of a split pea. In the course of two or three days the rash became distinctly petechial. In cases where a dispute had arisen as to whether these spots could be due to measles, their characteristic typhus-like aspect was well shewn by tying a ligature round the root of limb, after washing the arm with soap. The throat cough, which increased along with the rash and high fever, made the child very uncomfortable and necessitated an examination of the throat, which revealed a diffuse redness of the fauces, over which scattered red spots of a maculo-papular nature were observed, and which I took to be the rash appearing on the mucous surface and thus giving rise to painful aggravated cough. Koplik's spots were altogether absent, as also was occulo-nasal catarrh. Many looked upon the erythema as a part and parcel of the rash, and, as this was more prominent over the tender cheeks of the children, they noted this point as one against typhus on the ground that the typhus rash spares the face. The rash persisted for a month or so after convalescence.

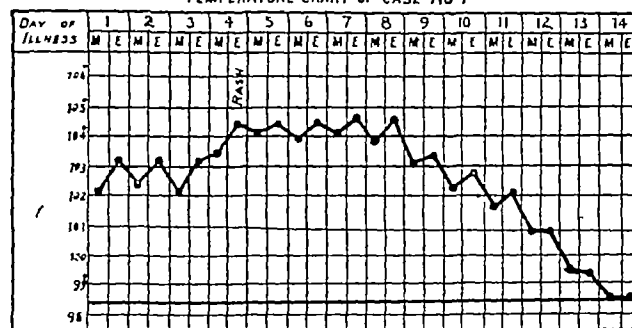
Some looked upon the hacking throat cough, due to the irritation caused by the appearance of the eruption in the throat, as due to catarrh of the throat and so considered this symptom as one in favour of measles, but the absence of epiphora and coryza rules out such a possibility. By this time delirium increased very much and the child would sometimes rush out of bed. Sickness gave way to vomiting, there was intense headache, the tongue became dry and showed a white fur, there was great thirst, the urine became scanty and high coloured and most of the patients remained unconscious during this period.

3 *The third period or the period of termination*—After reaching the fastigium about the 6th day and remaining at that level for another two days, my series of cases showed signs of abatement from the 9th day. The temperature dropped about a couple of degrees. The patient appeared more comfortable, the delirium lessened,

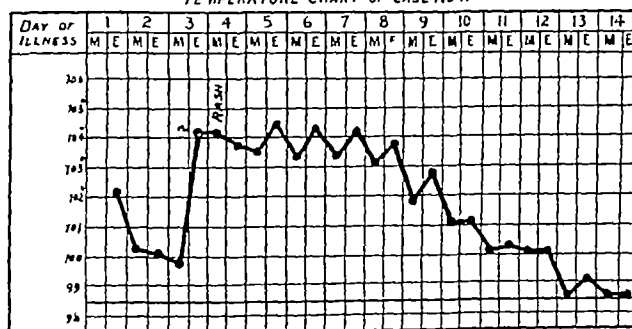
the vomiting subsided, and the throat cough gradually disappeared. The tongue became moist and clean. From this day onward the temperature lessened gradually till it became normal at about the 12th, 13th or 14th day.

Most of the spots slowly faded away, in some cases the dark marking lingered for some time and appeared as a distinct pigmentation of the skin. *There were no hæmorrhages from the mucous surfaces, no melæna, no hæmaturia.* There was nothing in the lungs except slight bronchitis in one or two cases,—the other organs were normal. Moderate enlargement of spleen was present in 5 cases only.

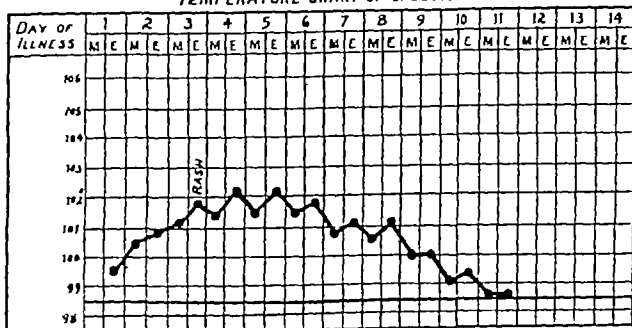
TEMPERATURE CHART OF CASE No I



TEMPERATURE CHART OF CASE No II



TEMPERATURE CHART OF CASE No III



#### THE ROLE OF LICE IN THE CAUSATION OF THESE CASES

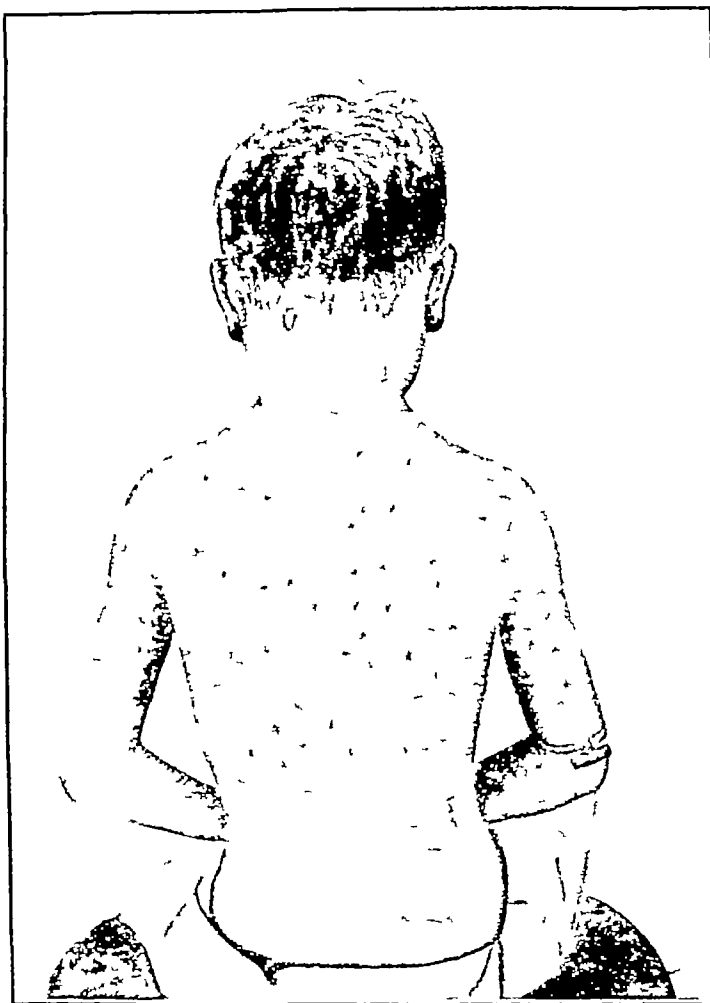
In 3 of these cases in Simla, lice were discovered on the hair of the scalp and the eye-lashes by me. Similar attempts in other cases had negative results. This ought not to prejudice the diagnosis. Very often in acute infectious diseases the source of infection remains *unscathed*, but the infection is all the same present. I believe that the part played by bacteria or parasites in the propagation of diseases has its limitations. Their presence *alone* cannot render a man vulnerable to infection by them.



Osler says that in outbreaks of sporadic typhus the origin may be very difficult to trace. He has quoted two such outbreaks,—one at a house of refuge in Montreal in 1877 in which eleven persons were affected, and the other in 1901 at the John Hopkins Hospital, where 3 cases occurred. Again, if Rocky Mountain spotted fever and Japanese river fever, both believed to be different types of typhus, can be caused by the bites of ticks and mites, who knows whether these cases of typhus fever may not have been produced by bites of insects hitherto unknown? In the ende-

logical conditions necessary for typhus. Lice, as reported previously, were extracted from three of these cases. All the cases except one occurred in the same house, and the boys used to huddle together in one small tiny room. Owing to the poor health of the children and on account of the season being winter, their underclothing was never removed, which thus facilitated the harbouring of body lice. We all know that high temperature, diminished humidity, excessive sweating and shedding of clothes are unfavourable to the body louse.

#### CASE II



Photograph taken one month after the convalescence. The typical petechial rash is still present.

mic areas of typhus in the Punjab, the people living there swarm with lice and typhus is also present, but why is typhus not more prevalent considering the number of people harbouring lice?

#### EPIDEMIOLOGICAL SURVEY OF THE CASES

As will be evident from the map, infection was at the bottom of all those cases that occurred in Simla and these cases also satisfied the epidemio-

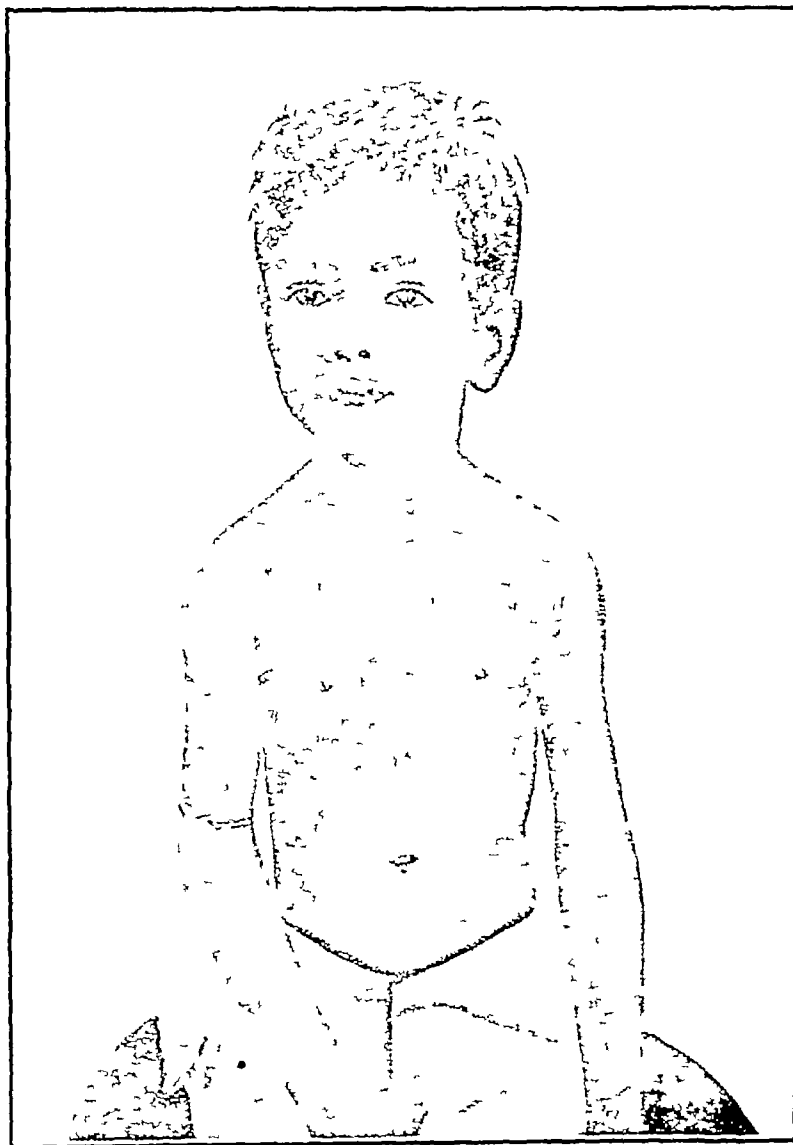
It may be said that my cases were not among the slum quarters and so the disease may not have been typhus. I do not agree to this conception of Rudolph Virchow. I do not think that diseases are the monopoly of the poor, and that rich people are immune to them. If a rich man is dirty in habits, I can find no reason why he should not contract more diseases than a poor man with clean habits. I believe it will be fair to admit that just as typhoid fever, dysentery and other

acute infectious diseases find a ready soil under such debilitating circumstances, as famine, war, etc., and at the same time they are also rife in all sections of the community, rich middle class and poor people, so typhus fever, being one of the infectious diseases, obeys the same laws. It is no more a famine fever or an army fever than are dysentery, typhoid or cholera.

In my series of cases, the mortality was nil. This is no bar to the cases being typhus. For we

mistaken for typhus fever is measles,—especially malignant measles. A wider comparison with other diseases with rash is evidently out of place. Measles is ruled out of court owing to (1) absence of oculo-nasal catarrh, (2) absence of the horse-shoe shaped rash appearing first in the circum-oral region, (3) absence of Koplik's spots. Malignant measles is likewise out of the question mainly because the mortality is very high in that disease, and hemorrhages occur from the

## CASE II



Ventral aspect of Case II, showing the absence of rash on the face

all know that mortality in epidemics increases after the epidemic obtains a foothold and lasts for some time in a place. Again in children every winter has reported the mortality to be very low, almost nil. Reference to an article on typhus fever in children, in the *British Journal of Children's Diseases*, p. 24, 1920, by A. Strevoe, will emphasise the point.

### THE DIFFERENTIAL DIAGNOSIS

As most of the cases occurred in children, I believe the only other disease which I might have

mucous membranes. In the cases which recover, the symptoms abate from the 5th or 6th day, whereas in my cases, the disease was at its zenith on the 5th or 6th day. Indeed the celebrated Virchow has rightly remarked that "inexperienced persons, nay unskilled medical men, have mistaken this illness in children for measles."

### DIAGNOSIS

In only 3 of my cases was the Weil-Felix test carried out, in two cases by Dr. Mondal, Assistant to Major Acton and in one case by Major

Acton In the two cases done by Dr Mondal, the blood was examined about a fortnight to three weeks after the temperature came down to normal and showed the Weil-Felix reaction positive, 1 in 30, in both, in the other done by Major Acton, on the 5th day of illness, there was no agglutination at all. As in only 3 out of 15 cases the agglutination test was done, it would be unfair to base any conclusion upon the results of these tests. In 3 cases in which the reaction was tested and found negative, no disappointment need be entertained, if we remember that the negative findings of a laboratory have very little value.

*The diagnosis of exanthematic typhus was made on the following grounds—*

#### *Sudden Onset*

(1) The early appearance of nervous symptoms, such as headache, delirium, vomiting, and prostration

(2) The character of the exanthema, its appearance on the 4th or 5th day and its hæmorrhagic nature

(3) Its persistence for some length of time

(4) The continuation of the fever for more than a week, ending on or a little before the 14th day in all the cases observed

#### CONCLUSIONS

From what has appeared above there remains very little doubt that the cases recorded were cases of exanthematic typhus. If in spite of the reasons given above, any one thinks that the diagnosis has not been fully established in the absence of a positive Weil-Felix reaction and also in the absence of lice in the cases of some of the patients, my answer is, 'Is there any difficulty in diagnosing most of the eruptive diseases, e.g., small-pox, measles and scarlet fever, although no germ in these cases has ever been isolated, nor is the mode of infection known?'

Brill failed to produce his disease in monkeys, blood cultures in his cases were also negative and agglutination tests were not done, yet everybody has accepted Brill's cases as cases of typhus from his clinical account of them. If such were possible, what difficulty can there be in accepting my cases as cases of typhus fever?

My thanks are due to Lieutenant-Colonel J. W. D. Megaw, M.S., Director of the Calcutta School of Tropical Medicine, for the kind help he rendered me and the facilities he has given for conducting these investigations, also to Major H. W. Acton, M.S., and Dr. Upendra Nath Mondal of the School of Tropical Medicine, Calcutta, for doing the Weil-Felix reactions.

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## BERIBERI AND RICE CONTROL IN MALAYA

By C. E. COBB, M.R.C.S. L.R.C.P., D.T.M.,

*Medical Officer Kuala Pilah,  
 Federated Malay States*

### INTRODUCTORY

IN Malaya in normal times the Chinese eat white rice only, the Indians parboiled rice, and the Malays chiefly undermilled rice which they themselves grow and prepare. When Malays are unable to obtain their "kampong rice," white rice is substituted. In consequence of these peculiarities beriberi is prevalent in Chinese, almost unknown in Indians, and comparatively rare in Malays.

The Chinese labouring classes have not yet been educated sufficiently to abstain from white polished rice, which is the most palatable, and which they have been brought up to believe is the best and purest. The more wealthy Chinaman, however, is able to afford a more varied diet together with his white rice, and therefore does not suffer to the same extent as the labourer.

From time to time suggestions have been made that there should be either some control on the importation of white rice or alternatively an extensive propaganda to educate the Chinese as to the cause of this disease, the symptoms of which they know only too well. It is as an additional argument for the adoption of the suggested propaganda, that I recorded the temporary disappearance of beriberi in the District Hospital of Kuala Pilah during the shortage of rice, which I think clearly demonstrates the possibility of eliminating beriberi from Malaya.

### THE RESULTS OF RICE CONTROL

At the end of 1921, it became evident that beriberi was increasing, and at first this was thought to be due to the poverty resulting from the rubber slump, so curtailing the diet of the coolies as to cause a deficiency of the necessary vitamins. However, on examination of the history of beriberi in Kuala Pilah for the last few years, it became obvious that this theory was untenable, as in 1918 when there was little poverty beriberi was far more prevalent than at the end of 1921. The attached chart was therefore prepared, which shows diagrammatically the monthly number of admissions for beriberi together with the total half-yearly admissions to the nearest 100, and it was seen that the admissions for beriberi began to decrease in August 1919, and were negligible from December 1919 to August 1921, but that since August 1921 cases were again regularly admitted.

At the beginning of 1919, there was a shortage of rice in Malaya, and in July of that year Government was compelled to institute a form of rice

control to prevent profiteering, and to ensure a fair distribution of the commodity. The disappearance of beriberi in Kuala Pilah, as will be seen from the chart, practically coincided with this rice shortage. In the beginning of 1921 when rice was again plentiful, beriberi again became endemic.

*Discussion of Results*—An examination of the alterations produced by the rice shortage in the diet of the Chinese coolie in the Kuala Pilah district reveals the following facts—

1 The amount of rice eaten by the individual coolie was reduced by about half, and flour was largely substituted to make up the deficiency, the majority of rice dealers only sold rice if their

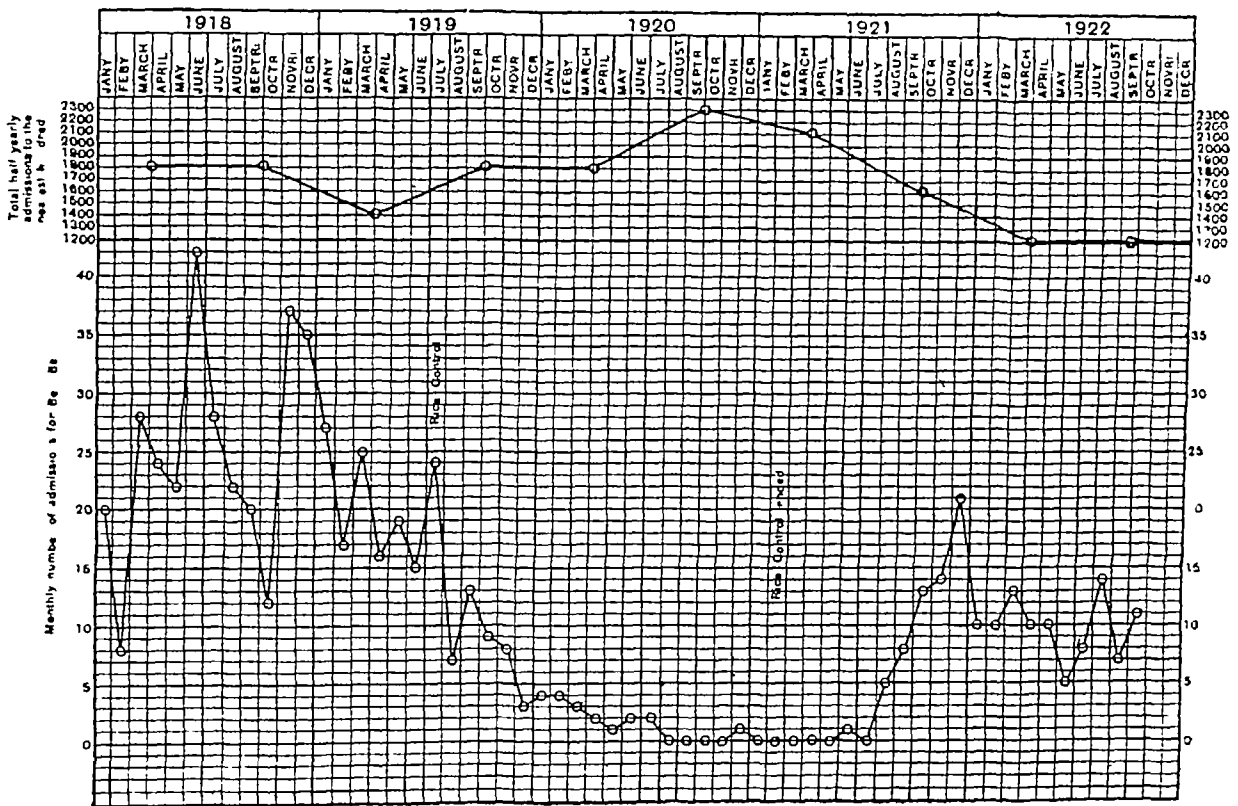
stored rice, and who were compelled to sell by reason of the trade depression, this “kampong rice” was not available in appreciable quantities.

Therefore an increase in the amount of flour and vegetables in the coolies’ diet, together with an improvement of the vitamin proportion in white rice, resulted in the disappearance of beriberi in Kuala Pilah in about four months, while a return to the old diet of much refined white rice and small quantities of vegetables, caused a return of the disease in a similar period.

CONCLUSIONS

We can therefore conclude that beriberi can be eliminated from Malaya, even without the total

KUALA PILAH DISTRICT HOSPITAL  
FEDERATED MALAY STATES



customers at the same time bought an equal quantity of flour.

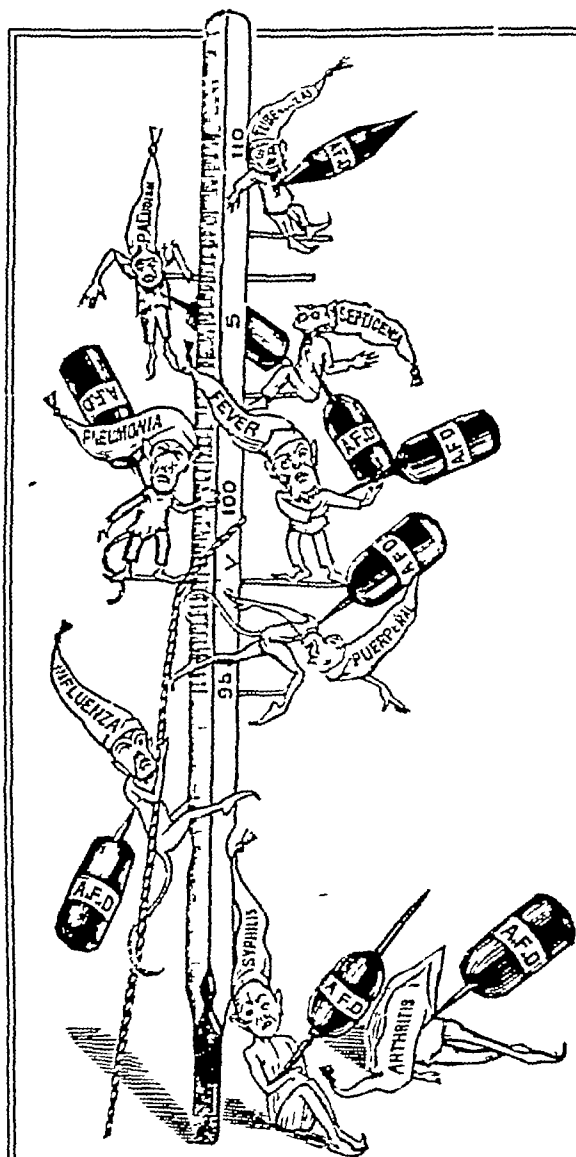
2 Vegetables, especially sweet potatoes and Indian corn, were eaten in much larger quantities than normally, and many coolies made one meal daily of flour cakes and vegetables. There was very little alteration in the meat and fish ration.

The rice consumed was of an inferior quality, white rice lightly milled, and therefore slightly richer in vitamins. Parboiled rice was not eaten by the Chinese, because there was a scarcity of all varieties of rice, parboiled being as difficult to obtain as white rice, indeed some of the Indians were forced to eat white rice as they were unable to obtain the parboiled. A few Chinese bought undermilled rice from the local Malays who had

prohibition of white rice, and that this result can be obtained if the Chinese coolie takes more vegetables and flour in his diet, and if the importation of only more highly polished varieties of white rice is restricted.

I do not suggest that propaganda would entirely eradicate beriberi, but I think, that with the co-operation of employers of labour, school teachers and Chinese societies, much could be done to persuade the Chinese coolies to take the necessary additional foods with their rice. The total prohibition of white rice would without doubt cause many difficulties in the labour problems of Malaya, but with the help of the extra foodstuffs, it would only be necessary to restrict the importation of the super-polished white rice.

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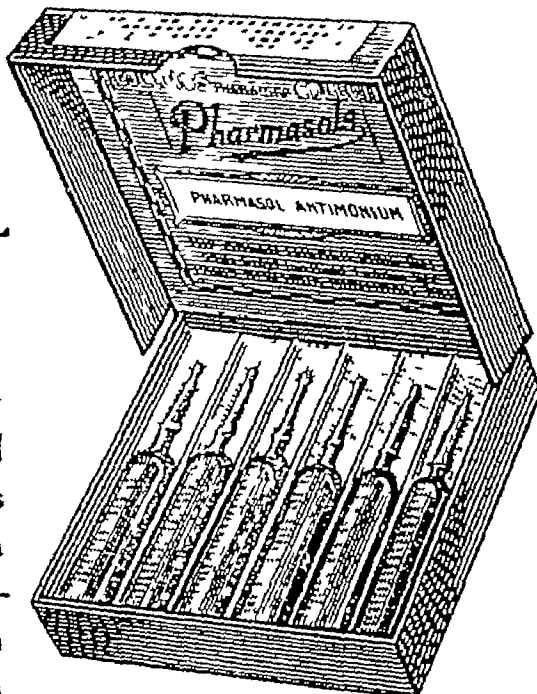
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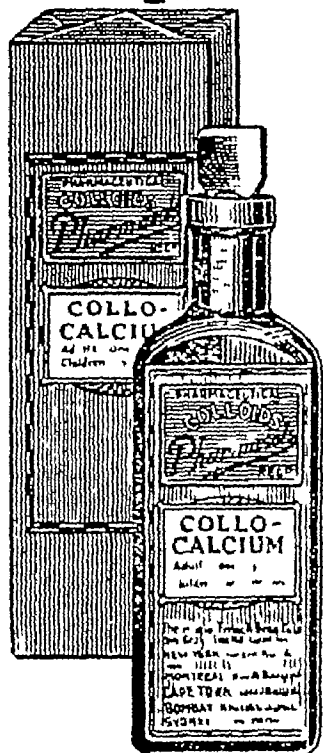
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# Indian Medical Gazette.

AUGUST

## INTESTINAL STASIS AND CANCER IN INDIANS

WE have received from Lieut-Colonel H Hallilay, M.B., F.R.S., an article on the subject of intestinal stasis in Indians, which is perhaps scarcely suitable for publication *in extenso* in its original form, but which raises questions of considerable surgical interest. In the introductory section of this article, Colonel Hallilay deals with the constitution of India dietaries, the Indian habit of drinking considerable quantities of water during the day, and the usual Indian custom of taking only two meals—both of them rather bulky—during the 24 hours. "See, Sahib," remarked an old Sikh Indian officer to him, as he watched a British regiment march past, "a fine sight, but you will be tired of waiting before the transport has had time to pass. It takes so many men and beasts to feed a British regiment, but the Sikh—give him a handful of *gram* and the same quantity of *ghur*, and he will march all day and fight at the end of it."

The result of the slightly irritating and rather bulky diet of the Indian agriculturist is a vigilant and active habit of the bowel, resulting in the passing of one—or more usually two—soft or semi-fluid stools a day, passed very early in the morning. The unsophisticated Indian *rajat* rarely passes a formed stool, whilst constipation is very rare indeed amongst the Indian masses, according to Colonel Hallilay. He instances a case of an Indian villager who came to hospital complaining of "very severe constipation." "I have a daily movement of the bowels" complained the sufferer, "but I pass formed stools."

Colonel Hallilay's 22 years of service comprise—(1) two years of regimental duty in the Punjab and North-West Frontier, (2) three years in the Himalayas in medical charge of an orphanage for European children, (3) two years in a civil surgeoncy in the Himalayas, where the medical practice lay almost entirely amongst agriculturist classes, (4) five years in the Lyallpur Canal Colony, varied by two summers at Murree, (5) five years of war service from 1914 to 1919 with Indian, and occasionally with British troops, (6) four years in Simla. Thus the conclusions to which he comes in his article are based upon a very wide and very varied clinical Indian experience.

"During my two years' service with Indian troops," writes Colonel Hallilay, "I never saw a case of appendicitis, of gastric or duodenal ulcer, or any of the sequelæ of such a condition, such as perforative peritonitis, or trouble due to subsequent adhesions. I never saw a case of cholecystitis, or anything remotely resembling it, neither did I ever encounter a case of gall-stones. Finally I never saw a case of cancer or malignant disease in any shape or form during the whole of this two years. During the whole of my time at Lyallpur, a populous district of over a million inhabitants, containing some 30 dispensaries, and for the whole of the statistical reports of which I was responsible, I never encountered or saw reported a single case of appendicitis, of gall-stone, of gastric or duodenal ulcer, I can recall only three cases of cancer,—two of the breast and one of the uterus. During my two years' tenure as Civil Surgeon of Kangra an extensive Himalayan hill district populated by cultivators and shepherds, I saw nothing of the above abdominal emergencies, nor can I recall ever seeing a case of cancer."

It is not to be inferred from this that the people did not come to hospital, or were averse to submitting to operations, on the contrary the operative work was heavy. The villagers submitted with great readiness to such abdominal operations as suprapubic prostatectomy, nephrotomy, intra-abdominal operations for ovarian cyst and the like. The same holds good with regard to the police and jail, the only three abdominal operations which I had to perform in the jail in five years in connection with 'acute abdomens' were the result of dysenteric perforation. During the war I saw and operated on one case of acute cholecystitis, a follower, a muleteer at Gallipoli, he had been constipated on the boat and in the trenches and was in a thoroughly run-down condition. That is the only 'acute abdomen' apart from war wounds and injuries, that I can recall during the whole of that campaign.

At Ambala, where there were nine depots of Indian regiments and a total strength of some 10,000 Indian troops there was not a single case of such abdominal emergencies during the year when I was in charge of the War Hospital there although appendicitis was comparatively common among the British troops in the same station.

My experiences lead me to conclude that intestinal stasis is practically non-existent in the unsophisticated Indian, that such surgical diseases as appendicitis, cholecystitis gall-stones with their complications, gastric and duodenal ulcer are all but unknown and that finally amongst the class that I have described intestinal cancer is of even greater rarity."

There is another side to the picture, however. When the Indian becomes sophisticated or takes to European diets and customs and among the educated Indian classes, he may become the subject of intestinal stasis.

During the war," writes Colonel Hallilay, "I had to operate more than once upon Indian officers holding temporary commissions in the Indian Medical Service, for appendicitis. Whilst holding the post of surgical specialist in Poona for nine months during the war, though appendicitis was unknown amongst the thousands of Indian troops there present, operations for gangrenous appendicitis were not uncommon at the Sassoon Hospital but all that I saw were in Indians of the well-to-do and professional classes."

Colonel Hallilay's conclusions are of great interest and value, as they are based upon so extensive a clinical experience, but he will admit, we think, that they have not the evidential value of collected statistics. Being anxious to obtain other and independent opinions from surgical specialists with extensive surgical experience among both European and Indian patients, we referred the matter first to

Major W L Harnett, M B, F R C S, I M S, Superintendent of the Campbell Medical School and Hospital, Calcutta, for opinion Major Harnett writes as follows —

"Colonel Hallilay's article raises questions which have puzzled many of us out here for a long time. Put briefly, these questions are —

(1) *Is appendicitis less common amongst Indians than amongst Europeans in India? If so, is this a question of diet?*

(2) *Is there such a thing as visceroptosis amongst Indians? If so, does it cause symptoms? Is this too, related to diet?*

(3) *Are gall-stones and gastric and duodenal ulcers as common here as in Europe?*

(4) *Is carcinoma as common amongst Indians as amongst Europeans? Does it affect the same parts?*

To answer these questions, we have but scanty material at present available. We are up against the fact that, apart from liver abscess, gynæcological cases and injuries, abdominal surgery as done at Home hardly exists in *mofussil* India. The Indian goes on dosing himself with medicines for pains in his stomach for years and dies of 'fever,' neither he nor his doctor having yet learnt that surgery has a say in these matters. Diagnosis and treatment everywhere, except in the big towns is of the most crude description, X-ray plants are not up to the standard of power necessary for barium meal work, facilities for chemical examination of test meals are non-existent, and there are comparatively few surgeons out here who have sufficient knowledge and technique to justify them in tackling this class of work. It follows that most hospital statistics in India are almost worthless, and that we must begin at the beginning.

My own views on these points are as follows —

(1) There is no doubt that appendicitis is relatively rare amongst Indians. I only see abscess cases and it is not usually advisable to burrow around looking for the appendix. In many cases I am sure that these so-called appendix abscesses are really peri-cæcal abscesses due to dysenteric ulcers and perforation. After healing of the abscess, the patients do not wait for a second operation. If this rarity of appendicitis in Indians is not due to the difference in diet, what is it due to?

(2) I have never seen a case of visceroptosis in an Indian causing symptoms.

(3) I have operated on Indians for gall-stones and for duodenal ulcer. Within the past four months I have seen six cases of gastric or duodenal ulcer in Indians, two proved by operation and cured by gastro-enterostomy, the other four shewing radiographic evidence of pyloric obstruction, but they were either bad surgical risks or went away to 'think about' an operation with the usual result.

(4) There is a fair amount of cancer among Indians. I have operated on several cases of carcinoma of the colon with intestinal obstruction, and these cases are not uncommon. Carcinoma of the breast and of the cervix uteri is frequent. Colonel Bradfield's work on pyloric ulcer and carcinoma has already received attention in your columns, whilst, as for epithelioma it is as common as the chronic irritation which engenders it. I am satisfied that both gastric and duodenal ulcers and internal cancer can be found quite often, if looked for carefully, and the lesson is the absence of team work and the general inefficiency in advanced surgical work in this country. The real point of importance in Colonel Hallilay's article is the question of the relationship of dietary to intestinal stasis and appendicitis in this country, and here we have something which needs working out. The *Indian Medical Gazette* might do admirable work by collecting reliable and properly tabulated information, from which in a few years we might deduce something. I believe Colonel Hallilay is right about the Indians who adopt

European diet getting constipated and being liable to appendicitis, I have heard the same thing myself from temporary I M S officers in Constantinople.

I may add that I have asked several of my staff about the matter. They are all assistant surgeons of from 12 to 20 years' standing and have seen a lot of hospital work in Calcutta and the *mofussil*. All agree that cases of appendicitis with general peritonitis do occur among Indians, but that they are not frequent amongst Indians of the peasant class. The one who has seen most cases has worked for years at the Medical College Hospital, where he would be more likely to meet with them than in the *mofussil*. All seem to think that cancer of the colon is distinctly rare, though all have seen cases of rectal carcinoma. Dr J M Dass looks on visceroptosis as a great rarity in Indians, and has only seen one or two cases. All agree that cancer of the breast and uterus are very common."

We next referred the question to Lieut-Colonel J C Holdich Leicester, M D, F R C S, I M S, as an officer with many years experience of gynæcological and abdominal work in both Indian and European patients. Colonel Leicester writes as follows —

"In reply to your queries, I should say —

(1) That appendicitis is certainly far less common among the poorer Indians than amongst Europeans. We scarcely ever see a case of appendicitis apart from one involved with the right uterine appendages, and here the lesion most probably started in the tube.

(2) Visceroptosis is a very rare condition in Indians of the peasant class.

(3) Gall-stones, I should also say, are much rarer than among Europeans.

I do not feel qualified to express an opinion of much value as to gastric and duodenal ulcers, but I can never recollect meeting with a single case of the sort amongst poorer Indians since I came to India.

(4) Carcinoma of the uterus and cervix, I should say, was quite as common amongst Indians as amongst Europeans. We see a large number of such cases at the Eden Hospital.

As to carcinoma of the breast, I should say it was not so common amongst Indians, but this is only an impression.

Finally, we referred the matter to Capt S N Mukerji, F R C S E, I M S, who has been for the past three years Resident Surgeon to the Medical College Hospital, Calcutta. Captain Mukerji writes —

"I read through Colonel Hallilay's article with great interest. I am sorry that Lieutenant-Colonel R. P. Wilson F R C S V H S I M S, has not got the time at present to contribute to the discussion, but he will perhaps do so later on.

I do not agree with Major Harnett as regards appendicitis in Indians. Personally I think appendicitis is common in all its forms among Indians. I agree with Colonel Hallilay that it is not common among Indian troops. I happened to be surgical specialist to one C F A and three general hospitals during the war. I saw very few cases of appendicitis. During the three years that I have been resident surgeon to the Medical College Hospital I have hardly seen a case of appendicitis from dysenteric perforation. I have operated here on 69 cases of appendicitis, 65 of the patients were Indians and 4 Europeans. Not one of these Indians had European habits. It is also questionable whether diet has anything to do with appendicitis in Indians.

Gastric and duodenal ulcers are not common among Indians. Or perhaps they prefer to be treated by physicians and don't come to the surgeon. But cancer of the stomach is not uncommon, as the public are

learning to appreciate the value of surgical interference, and more patients are coming into hospital. In May and June last we had 6 cases of cancer of the stomach in Indian patients, all proved to be such by operation. Visceroptosis occurs among Indians, but it is rare.

Gall-stones are fairly common among Indians. I can remember several Indian patients where a diagnosis of gall-stones had been made but who refused operation and went away. The following table gives the number of cases actually operated on at the Medical College Hospital during the last three years for the different conditions under discussion. It should be noted in connection with this table that the number of Indians admitted to this hospital is, of course, very much in excess of the number of Europeans admitted.

TABLE

Number of Appendicitis, Gall-Stone, Gastric Ulcer and Cancer Cases from 1st January 1921 to 31st May 1924, at the Medical College Hospital, Calcutta

No	Disease	EUROPEANS			INDIANS			Total of all cases
		Male	Female	Total	Male	Female	Total	
1	Appendicitis	58	43	101	171	22	193	294
2	Gall-stone	2	8	10	16	5	21	31
3	Gastric ulcer or duodenal ulcer	1	—	1	8	2	10	11
4	Rodent ulcer	4	3	7	1	1	2	9
5	Cancer of lip	3	—	3	4	1	5	8
6	Cancer of cheek and palate	—	—	—	3	5	8	8
7	Cancer of tongue	5	—	5	26	1	27	32
8	Cancer of larynx	2	—	2	19	—	19	21
9	Cancer of stomach	—	—	—	10	1	11	11
10	Cancer of intestine	1	1	2	13	2	15	17
11	Cancer of liver and gall-bladder	1	—	1	10	5	15	16
12	Cancer of bladder and prostate	1	—	1	4	—	4	5
13	Cancer of breast	—	10	10	—	23	23	33
14	Cancer of penis	1	—	1	14	—	14	15
15	Cancer of scrotum	—	—	—	1	—	1	1
16	Cancer of other parts	4	2	6	24	6	30	36

It will be seen, therefore, that there is considerable divergence of opinion among the different authorities who have so kindly contributed to the discussion. Intestinal stasis would certainly appear to be much rarer among Indians of the peasant class than among Europeans and Indians who have adopted European habits, but, in addition to the dietary factor, there may be other factors concerned, such as the adoption of the squatting posture in defaecation. The appendicitis question may be complicated by both dysentery and intestinal tuberculosis. The question of the rarity or otherwise of gastric and duodenal ulcer among Indians must be considered as still *sub judice* but both conditions appear to be not very uncommon.

The paper by Lieut-Colonel E W C Bradfield, M.B., F.R.C.S.E., I.M.S., O.B.E. (*Indian Medical Gazette*, Vol LVIII, March, 1923, pp 109-113) and the real team work between surgeon and radiologist now in progress at Madras may throw much light upon the problem. Major J A Shorten, M.B., I.M.S., an officer with many years experience of X-ray work in this country, in reply to an enquiry, informs us that he has seen visceroptosis in Indians, but he considers it uncommon, whilst cases of gall-stones he considers to be not at all uncommon in Indians.

With regard to constipation, the paper by Lieut-Colonel W W Jendwine, M.D., I.M.S., C.M.G. (*Indian Medical Gazette*, Vol LVIII, August, 1923, pp 381-382) shows that cases of a condition resembling acute paralytic ileus occur among unsophisticated Indians, whilst even the writer—in three years' experience of civil surgery work in the *mofussil*—can recall two similar cases, both in elderly Indian males of the *rayat* class, both fatal, and both without apparent obstructive cause.

With regard to intestinal carcinoma it will be seen that the opinions given vary. With regard to non-intestinal carcinoma, the condition is far more clear. Dr Neve's work shews the relative frequency of *kangri*-burn epithelioma in Kashmir, cases of carcinoma of the cervix uteri are quite common in all large Indian hospitals, whilst carcinoma of the breast also occurs. Epithelioma of the penis is also not infrequently encountered, and has even been known to occur in a Mahomedan patient.

Colonel Halliday's paper raises questions of great interest and importance, whilst Major Harnett's notes admirably sum up our want of real information on the matter. We would welcome reliable, accurate and properly tabulated information with regard to it,—preferably in the form of an answer to Major Harnett's questionnaire with a view to the collection of data for future analysis and comment.

Since going to press we have received a report from Colonel Bradfield on the work done on the surgical side of the Madras General Hospital, in 1923. Colonel Bradfield's article is so apropos to the subject under discussion that we hope to publish it as a special article in the October number, the first in which any space will be available.

#### A Note to Readers

Our readers will have noticed that in our last, as in this issue of the *Gazette*, no "Current Topics" have been included. The reason is that the pressure upon our available space has become so extreme that some drastic step had to be taken to deal with it. Accordingly, in order to secure reasonably early publication of articles accepted for publication, the

section of "Original Articles" has been increased to occupy the whole of the first half of the *Gazette*, and the "Mirror of Hospital Practice" has been transferred to follow the editorial. We trust that by this arrangement, it will be possible to relieve some of the present congestion, and to resume publication of "Current Topics" at the earliest possible moment—EDITOR, *Indian Medical Gazette*

## A Mirror of Hospital Practice.

### A CASE OF GANGOSA IN BALUCHISTAN

By H. T. HOLLAND, M.B., Ch.B., F.R.C.S.E.,

C. M. S. Hospital, Quetta

GANGOSA—rhino-pharyngitis mutilans (Leys) or granuloma gangrenosum—has as far as I know never been known to occur in India. Castellani and Chalmers (1919 edition) mention cases having been found in Ceylon.

This patient came to me in October 1923. His history is as follows—

The young man is aged 18, a native of Kandahar. His father and mother are both alive and well. No history of either heredit-

ary or acquired syphilis. Nine years ago he went on a trip to Baghdad, Basra, Bander Abbas and Koweit. He had never suffered from any illness till four years ago when a small pimple appeared on the left side of his nose, which gradually increased in size, and began to suppurate and then healed. This



No. 2—After operation

Patient is voluntarily closing his mouth



No. 1—Patient prior to operation

*Note.* The lower circular shadow near the buccal orifice is due to a circular depressed scar which was adherent to the subjacent alveolar margin of the mandible and indicates the extensive nature of the original ulceration at this site.

was followed by other ulcers in rapid succession, along the upper lip and spreading to the nose and both cheeks. Later on it spread to the lower lip and chin and progressed till his mouth contracted to the size of less than  $\frac{1}{2}$  inch in diameter. For the last nine months previous to admission he had lived on liquid food alone. On admission he had the appearance shown in photograph 1. There was no sign of either upper or lower lips and there was a circular hole one inch below the nose, which would not admit even the little finger, though an ordinary-sized pencil could be passed through it. Beneath this circular hole was another circular depressed scar, not communicating with the buccal cavity. The mouth was surrounded on all sides by vivid white scar tissue which had the appearance of old extensive burns. The two alæ of the nose had been markedly affected and both nostrils were contracted. He came to hospital to have a mouth made.

*Operation*—I passed the blade of a blunt-pointed pair of scissors through the circular hole and cut through the scar tissue on either side and found the mucous membrane inside the mouth freely moveable. I was thus able to unite it to the skin outside and to make a new fair couple of lips for him both lower and upper. Photographs 2 and 3 were taken a month after the operation, when he was able to open and shut his mouth freely, the patient retaining the muscular mobility of his lips.

I am indebted to Major A. S. Cane, R.A.M.C. in charge of the Divisional Laboratory, Quetta for very kindly doing a differential blood count, a Wassermann test and examination of



No 3—After operation

Patient is opening the mouth to show his teeth showing retention of muscular mobility of the lips

At rest there was not perfect approximation of the lips. This could be attained by a small plastic operation (Nelaton's) to restore the central projection to the upper lip.

smears. His report is as follows—"The Wassermann reaction definitely positive." This coincides with Castellani's finding in gangosa. The differential blood count was normal, eosinophiles only 1 per cent. Marshall and Musgrave report in their case 26 per cent.

The scrapings from the edge of the lower lid where there was some ulceration revealed nothing. I stained specimens by many and varied methods including Ziehl-Neelsen's method, but could find no acid-fast (e.g., lepra)

bacilli and no other organisms or leishmania bodies or spirochaetes at all, excepting a few staphylococci which would be a secondary infection only and not responsible for the condition. The whole appearance of the patient so exactly tallies with that described in Castellani and Chalmers' book, that Major Cane, Capt. Sargood Fry, I.M.S., late operative specialist to the Quetta Division, and Dr. Nicholl all agreed that this was an undoubted case of gangosa. I am indebted to Capt. Sargood Fry for the excellent photographs.

Daniels, Schmitter and Kerr believe gangosa to be a late manifestation of yaws in India, but yaws in India is of great rarity and this patient has not visited any country where yaws is prevalent.

## A CASE OF STONE IN THE BLADDER WITH PROLAPSE OF THE RECTUM

By R. M. KAR, M.B.,

*Assistant Surgeon, Baripada, Mayurbhanj State*

SANKAR SING, a young man, aged 20 years, a resident of Ghatsila, Dhalbhum, came to Baripada Hospital, Mayurbhanj State, complaining of bleeding from the urethra, frequent desire for and shooting pain at the root of the penis during micturition, which was of a "stammering" character and scanty for about a month. He had got temporary relief after catheterisation in a local dispensary. Later on the complaints grew worse, the rectum became prolapsed and there was much straining and frequent passage of stools with blood and mucus. At times he was in such agony that he inserted his fingers into the rectum and tried to pull out the lump that was protruding there.

On passing a silver catheter into the bladder and a finger into the rectum, a stone in the bladder could be felt.

Operation was performed under chloroform as detailed below—

The bladder was first emptied and then distended with warm boric lotion. The lower abdomen, just above the pubic bone, was opened for about two inches in the middle line. The skin, muscles and other soft tissues were retracted on either side. The bladder wall was pulled out, fixed and cut open. The stone was found to be a big one and both the skin and the bladder incisions had to be enlarged. The stone forceps failed to grasp the stone and at last with great difficulty it was removed with the fingers whilst an assistant introduced his index finger into the rectum and pushed the stone forward. The bladder wall and the muscles and the skin of the abdominal wall were stitched up separately. A soft catheter was introduced into the urethra to drain the urine into a bottle. The stone

weighed 5 ozs 7 drs and is the largest ever removed in this State. Unfortunately the wound became septic later on and some of the stitches had to be removed. He gradually improved and at present there remains only a very small opening through which urine is dribbling out. It is intended to suture up that small opening very shortly.

The interesting points in this case are the prolapse of the rectum, the straining efforts and frequent passage of stools with blood and mucus and also the agonising pain which caused him to insert his fingers into the rectum and try to pull out the lump formed by the large size of the stone.

### HEREDITARY GLAUCOMA AFFECTING THREE GENERATIONS

By H. T. HOLLAND, M.B., Ch.B., F.R.C.S.E.

*C. M. S. Hospital, Quetta*

A YEAR ago when I was out on the Baluch-Persian Frontier at a place called Ladgarhat, about 50 miles from Kundin Station on the Meshki-Dazdap extension, I came across three brothers of the Reki tribe all blind in both eyes. Sindan Kia Khan and his two brothers. My interest was at once aroused and I enquired how it came about that all three were blind and some one—evidently an authority on the ætiology of the disease—said it was due to their swearing falsely on the *Quran*! I made careful enquiries into their family history and found that their mother had become totally blind at the age of 60 in both eyes and that her three sons had all become blind between the ages of 50 and 60. Sindan Kia Khan had been to Col. H. Smith of Amritsar for operation and apparently an iridectomy had been done but with no improvement.

I took a photograph\* of the three brothers, the three old men standing behind and two of their sons sitting in front, and told them that if any of the third generation were affected to let me know at once. This year I discovered that a fourth brother was also blind in both eyes.

The family history is as follows—

(1) The mother became blind about the age of 50, in both eyes.

*Sons—*

(2) Sindan Kia Khan—lost the sight of both eyes at the age of 60. Has one son and two daughters, all alive and with no eye symptoms.

(3) Hayat Khan—lost the sight of both eyes also at about the age of 60. Has two sons and three daughters. One son aged 30 has now double glaucoma, the other son and three daughters have no eye symptoms.

(4) Roshid Khan—lost the sight of both eyes at the age of 55. Has one son and two daughters with no eye symptoms.

(5) Sultan Mahomad—lost the sight of both eyes at the age of 50. Has two sons alive with no eye symptoms.

(6) The only member of the third generation who has so far developed glaucoma is Rasul Bakhsh, aged 30, son of Hayat Khan. He came to me in July of last year, with the sight of one eye completely gone due to glaucoma and in the other he could only distinguish hand-movements. I did a broad iridectomy on that eye and he returned last month with his vision slightly improved, he could not count fingers, but in a bright light was able to walk about by himself.

This must surely be a unique family, mother and four sons all suffering from double glaucoma and a grandson aged 30 with double glaucoma, that is to say, three generations. I intend, if possible, to keep in touch with this family and will report any further cases of glaucoma in the third generation. They all seemed to have had the classical symptoms of glaucoma, pain in both temples with gradual loss of vision. In none had the onset been acute.

Fuchs states that there have been many cases of glaucoma running through families, but I wonder if in any family four brothers have been similarly affected.

### A CASE OF COMPLETE TRAUMATIC DISLOCATION OF THE LENS UNDER THE CONJUNCTIVA

By N. N. GHOSH, M.B.,

CAPT., I.M.S.,

*Deoghar*

ROMANI, 40, Hindu female, was admitted to Serajganj hospital with a whitish-looking tumour on the right eyeball just above the cornea. She gave a history of an injury to the right eye (accidentally struck by a projecting piece of bamboo in the dark) about three weeks before admission.

Vision was blurred in the right eye, the pupil irregular, the iris looked drawn upwards—probably due to partial prolapse and healing up *in situ*. The tumour was about the size of a small marble, slightly fluctuating, painful on pressure and whitish. The pupillary reflex was absent and the pupil did not contract on dropping in physostigmin. There was some circum-corneal injection.

After cleaning the eye and dropping in cocaine and adrenalin solution, the tumour was incised and a cataractous lens was extracted from inside the tumour along with some glairy whitish fluid substance like vitreous humour. The sclerotic being ruptured, the cataractous lens had dislocated into the sub-

\* We regret very much that Dr. Holland's photograph is not clear enough for satisfactory reproduction (Editor, I. M. G.)

conjunctival tissue along the upper edge of the cornea. There was no appreciable improvement of vision after the operation, nor did I expect it.

### SOME INTERESTING EYE CASES

By B K NARAYAN RAO, M.B.,

M.R.C.S. (Eng.), D.O. (Oxon.),

Superintendent, Minto Ophthalmic Hospital, Bangalore

#### I *Transient Exophthalmos during Operation for Cataract*

NARAYANMA, a Hindu female, aged 45 years, mother of three children was admitted to hospital on 23rd September, 1923, for blindness of the left eye caused by a mature cataract of about one year's duration. No history of any definite previous illness except, she says, that her health had much deteriorated after the death of a son a few years ago.

*Examination*—Right eye normal. Left eye healthy except for a mature cataract, pupil active, tension normal, perception of light and projection good. Patient had an enlarged thyroid gland which felt cystic and was about the size of an orange and freely movable. The lateral lobes were particularly large and there was no pulsation over the tumour, it had existed from her 10th year—only growing gradually to its present size. There were no other signs of exophthalmic goitre though the pulse rate was higher than normal, being about 100 to 120 per minute, the blood pressure was 150 mm. The patient had marked pyorrhœa alveolaris and impaired digestion, the bowels were regular and menstruation normal. Nervous and other systems normal, urine healthy.

On 24th September, 1923, she was operated on for the cataract. Before being put on the table, she had two instillations of a 2 per cent cocaine solution at an interval of 10 minutes. On the table it was noticed that the eyeball had become so unduly prominent that it was inconvenient and unsafe to use the ordinary speculum, and the operation was performed by holding the lids apart by fingers. While bandaging, it was noticed that the eyeball could scarcely be covered completely by the lids. As the patient was in a very excited condition, shivering all over the body, she was not allowed to walk to her bed as is usual in this hospital, but was carried on a stretcher.

The patient was very nervous throughout the day and had to be given sedatives. On the third day the bandage was opened and it was found that both eyeballs were equal in size and there was no proptosis whatever in the operated eye, on the fourth day she had slight hæmorrhage into the anterior chamber which disappeared under treatment. She was discharged cured on the 10th day after operation.

Exophthalmos is generally considered to be due to irritation of the sympathetic nerves which supply Muller's orbital muscle, covering the infra-orbital fissure and sending fibres to the eyeball.

This muscle is well developed in some of the lower animals while only traces of it are described in the human orbit. Drugs like cocaine have a stimulating effect on the sympathetic as also have emotions such as anxiety, fear, etc. In this instance it is doubtful whether the exophthalmos was due to the existence in unusual numbers, of bundles of Muller's muscle, or whether due to the effect of cocaine or to emotion. The other eye, which had no cocaine instilled into it, showed no such abnormality. A further point of interest is that this occurred in a woman who has a cystic goitre without showing most of the common symptoms of exophthalmic goitre.

#### II *Hemianæsthesia of the Face with Ulcer of the Cornea*

Channa Chetty, Hindu male, aged 35 years, was admitted on 17th November, 1923, for inflammation of the right eye and numbness of the face.

*History*—Seven years ago the patient had suffered from syphilis and gonorrhœa, subsequently he had joint pains. Six months ago he had severe headaches, worse at night. This lasted for about four months. The headaches gradually subsided, but the right half of his face was getting numb. The right eye became red, later painful, with lachrymation, photophobia and blurred vision. For the last month he had been losing sensation on one side of tongue and nose.

*Examination*—Left eye normal. Right eye conjunctiva slightly congested, cornea ulcerated at its centre. The ulcer occupies about 1/3rd of the whole area of the cornea and is uniformly shallow all over as if the superficial layers had been denuded. The edges of the ulcer are slightly overhanging. At about 11 o'clock position, there is slight irregularity due to heaped up epithelium. In the base of the ulcer there are two areas which have a greyish infiltration. The whole ulcer looks only slightly less shining than normal. The whole cornea is anæsthetic. There is lessening of lacrymal secretion. Vision blurred.

There is anæsthesia of the right side of the face up to the middle line, including the nose and lips. The mucous membrane of one-half of the mouth, half the tongue and palate, have all lost sensation of all kinds. There is only a small patch of skin about an inch in diameter below the right corner of the mouth where there is some sensation. The sensation of taste has also been lost in the right half of the tongue. Nervous system otherwise normal. Reflexes normal. Posterior cervical and epitrochlear glands are enlarged.

The blood examination showed a positive Wassermann reaction.

*Treatment*—The patient was put on to mercurials and iodides and intravenous salvarsan. Locally, atropine, dionine and collargol were employed. After a stay of three weeks, the patient improved considerably, the anæsthesia became less and the ulcer healed leaving a delicate nebula. Vision was slightly defective when he was discharged.



### III Two Cases of *Synchysis Scintillans*

*Case 1*—Adam Gham, Muhammadan male, aged 28 years, single, came to the out-patient department for difficulty in reading and writing at night. Duration of complaint 2 years. No history of any previous illness except that he had an attack of bubonic plague when 6 years old. Had sore eyes 6 years ago, recovered completely.

*External Examination*—Both eyes normal. Atropine was instilled and retinoscopy done. The right eye had 6 degrees of hypermetropia, left eye 5 degrees of hypermetropia with 2 degrees of astigmatism in an oblique meridian.

Ophthalmoscopic examination showed in the right eye numerous fine flake-like reddish yellow shining particles which had a limited movement. There were no vitreous opacities. The left eye was quite normal. The patient was corrected for his refractive error.

*Case 2*—Andalamma, Hindu female, 40 years, married, mother of two children, was admitted as an out-patient with complaints that there was occasional burning of both eyes and difficulty in reading at night. Previous history, nothing noteworthy. Patient says that she had sore eyes after child-birth about 10 years ago. General health good.

Ophthalmoscopic examination under homatropine. She had brilliant yellowish white flake-like particles of varying size all through the vitreous of the right eye. They had a slight range of movement with the movements of the eyeball. The left eye showed no such abnormality.

Both eyes showed a slight amount of manifest hypermetropia, and the usual amount of presbyopia, which were corrected by proper glasses.

*Synchysis scintillans* is due to crystals, usually of cholesterol, floating about in the vitreous. It is said that these crystals are liquid in consistency and that this condition occurs generally as a senile phenomenon.

In these two cases the condition had occurred at comparatively early ages and it was unilateral, without any evident cause, one eye alone being affected. Further, occurrence of this condition did not apparently affect vision in any way, and thirdly, in the first case the abnormality occurred in the eye which had the lesser refractive error.

### A CASE OF MISSED LABOUR

By PANDIT SHAMBHU NATH MISRA,

*Civil Surgeon, Sultanpur (Oudh)*

THIS is the first case of its kind within my 25 years' experience of hospital practice. A multipara with six previous normal confinements, aged about 30, was admitted to the hospital on the 24th March, 1924, with a history of pregnancy dating from the 1st January, 1923. She had her last regular menses in the month of December 1922. She noticed and felt all

the usual signs and symptoms of a normal pregnancy in the usual course of events. In the month of September, 1923, one day the usual labour pains began but in a very mild form and remained so for a day and a half, followed by a copious discharge of blood and water afterwards, no foetus was delivered. The pains subsided and the size of the abdominal tumour was also reduced. She was not attended by any *dai*, only the women of her family attended her. It is quite possible that they may have handled the parts with their usually dirty hands and fingers and appliances, although she denies this.

A week or so afterwards she began to get fever and a free discharge of foul pus from the vagina. She remained in this condition in her village for about six months. When she felt very much broken down in health on account of the continued fever and foul discharge from the genitalia, with no delivery of the foetus she applied to hospital for treatment on the 24th March, 1924.

*On examination*—Foul pus was coming out of the vagina, a hard fixed tumour equal to the size of an ordinary melon occupied the hypogastric region, temperature 101°F. Pulse regular and weak, 90 per minute, thoracic organs normal, except for slight hypostatic congestion in the lungs. The tongue was coated and furred, the bowels constipated, and the digestion disturbed. General health bad.

She was put on a milk diet with ordinary diaphoretic and stimulant mixtures, with salts three times a day and douching with Condy's fluid morning and evening. On the third day after admission, when the quantity and quality of the vaginal discharge changed, I examined her and found the cervix hard and sloughing, the os very slightly dilated and a hard mass palpable, with no pulsation in the fornices. The patient's general health improved, the discharge becoming less and getting thin. On the 31st, I was surprised to find a rib in the discharge. After douching the parts thoroughly I found the os dilated and the bones of the head of a foetus palpable. The patient was given an enema and the parts were well douched and next morning she was put under chloroform and the foetus extracted with the help of forceps.

The whole thing came out in a disorganised state. The hand was put in and the interior of the uterus thoroughly explored. The cord and the placenta were absent *in toto*. The interior of the uterus was thoroughly flushed with antiseptic lotion and ergot given and the patient put to bed. The douching morning and evening was continued, with iron and strychnia stimulant mixture and milk diet. The patient made an uneventful recovery and was discharged cured on the tenth day.



This case is of interest on account of the following points —

1 The patient remained alive with a dead and disorganised foetus in the womb and copious purulent discharge for such a long time

2 On first examination, the case appeared to be one of uterine tumour with internal mischief

3 The uterus was in a state of tonic contraction. No foetal heart sounds were audible or fetal parts palpable

4 Douching of the genitals led to dilatation of the cervix

5 Thorough and careful examination of the discharge led to the correct diagnosis

6 The placenta and cord were absent. Probably they were first affected and were the source of the purulent discharge

### A CASE OF THE TETANY OF PREGNANCY

By V A KRISHNAMURTY, M.P.

*Chodazaram, Vizagapatnam*

A A, a Hindu female, aged about 20 years, a multipara, came down from Calcutta while I was at Pandur, for her confinement. She was said to be getting steadily weaker since she conceived and now and then got into what the patient said was "a fit of unconsciousness." She was first seen by me about the middle of last September. She was then found to be about eight months' pregnant, the attitude, presentation and position of the foetus being normal. The woman was very anæmic, unable to relish or digest any solid food and generally constipated. The urine was free from albumin. She was asked to take strict rest in bed, liquid diet in small quantities at frequent intervals, e.g. Horlick's milk, weak coffee, albumin water and milk once or twice a day. She slowly improved but the constipation generally remained much the same, and with the constipation there was auto-intoxication, loss of appetite, etc. She had therefore to be relieved by enemata. An enema used to move her bowels but the moment the colon was evacuated, she used to become unconscious, her face blue, her limbs and the uterus rigid and the fingers clenched. The usual treatment adopted was to keep the head low, loosen all clothing about her, allow free access of air and apply ammonia to her nostrils. She would inhale any amount of ammonia for even 20 or 30 minutes on end with only an occasional move of the head from one side to the other in response. Some hot coffee in teaspoonfuls, brandy and hot water or a dose or two of stimulant mixture used to bring her round. Sometimes she would require an injection of adrenalin. She was for about five weeks in this condition before delivery and invariably

she used to get into the above state every time. The constipation had to be relieved either by enemata or mild laxatives, so that every four or five days it became a practice for me to be ready to treat her fits. She was so very delicate that once she had a fit even after mere micturition. Each time this sort of fit came on, it used to last several hours, the longer fits lasting about five to six hours. Her improvement in other directions was fair but not very satisfactory. Seeing that she was in a dreadfully weak condition, I advised her people to summon another medical friend for assistance if necessary. I was prepared to meet every possible complication from forceps to post-partum hæmorrhage. One morning I was sent for as the patient complained that pains were coming on. I sent my midwife and promised to see her again in another two hours. In the meanwhile, I made all preparations and in the next four hours with remarkably strong pains she delivered a healthy well-developed male infant. From the moment of delivery she became ravenously hungry, began to relish drink and food without any nausea and had soon recovered in a few days. In about three weeks she was perfectly healthy, eating two meals a day and with good appetite. She was in the best of health and nursing her four month's infant when last seen by me.

I report the case chiefly with a view to diagnosis, and to enquire whether such unconsciousness for prolonged periods is common. The case appears to be one of the tetany of pregnancy.

[*Note*—We have referred the case history to Major V B Green Armytage, M.R.C.P., I.M.S. who remarks as follows—"The case is almost a classical description of the tetany of pregnancy. I have seen 8 such in 15 years, and the author is to be congratulated on his close observance of the case. It would be interesting to know if the patient developed the symptoms again after lactation. His giving adrenalin, with the—unconscious—idea of fixing calcium ions, was good, for the thyroid parathyroid and calcium metabolism in anæmic multiparæ in Bengal is peculiarly liable to be exhausted. Such cases are often labelled 'hysteria' or eclampsia but the urine contains no albumin the mortality is negligible and the child is usually born in a very viable condition'—EDITOR *Indian Medical Gazette*]

### A LARGE MONOLOCULAR OVARIAN CYST

By G B ARCHER, M.B. (Toronto),

*C M S Medical Mission Ranaghat*

M—, a Mohammedan widow, aged approximately 45 years, complained of a greatly enlarged abdomen. The patient stated that the enlargement had begun five years previously low down on the right side and had steadily increased.

The note was tympanitic in both flanks. This symptoms, the long duration, and the

immense size of the abdomen pointed to ovarian tumour. The patient was emaciated but not so markedly as one sometimes sees in cases of ovarian cyst. She could only walk with assistance, but this was due to the size of the abdomen rather than to weakness. The lower ribs were pushed out in a marked degree. The patient weighed 168 lbs. The photograph gives a good idea of the size of the abdomen.



Following the advice of Dr Howard Kelly of Baltimore, I tapped the abdomen and drew off about two-thirds of the fluid, to prevent shock at the time of operation. Two and a half large pails, 70 lbs by weight of fluid, were withdrawn. The fluid was colourless, its specific gravity 1008. After this partial withdrawal of fluid, on bimanual examination the left ovary could be felt, but not the right.

Four days later the abdomen was opened by a mid-line incision and the remainder of the cyst contents removed by an ovarian cyst trocar. Unfortunately the greater part of this fluid could not be collected. The cyst was then separated by a gauze sponge from what was thought to be loose adhesions to the parietal peritoneum.

I experienced some surprise when the whole cystic mass separated off easily with

no sign of pedicle and left the general peritoneal cavity open only at the lower part of the incision, a serous layer remained, separating off the general peritoneal cavity, so that at first sight it appeared that the cyst had been extra-peritoneal.

What had happened was as follows —The peritoneal covering of the cyst had become adherent to the parietal peritoneum, and the abdominal incision had been made through these layers to the fibrous coat of the cyst. In this case the fibrous layer was but loosely attached to the serous coat and separated off without any difficulty, leaving a surface slightly oozing blood. This was verified by examining the uterus and tubes and the serous layer of the cyst which remained behind. The left tube and ovary were normal. The right tube was enormously elongated and thickened and had been spread out on the under surface of the cyst and now remained in the serous layer, forming its thickened lower border and extending upwards to the liver.

As the patient's condition was not very satisfactory, the general peritoneal cavity was closed off by suturing the parietal peritoneum at the lower part of the incision with the lower border of the serous layer of the cyst referred to above.

A loose gauze packing was inserted to drain the blank space left by the cyst's removal. The rest of the incision was closed. A certain amount of clot formed in this space which later became purulent, but this completely closed in about three weeks. The patient subsequently left hospital in an excellent state of health, and well nourished. As her weight was even then only 67½ lbs, one may safely conclude that the cyst weighed at least 100 lbs.

### A CONGENITAL ABNORMALITY OF THE UTERUS AND VAGINA

By G B ARCHER, M B (Toronto),  
C M S Medical Mission, Ranaghat

A Mohammedan woman, aged 19, complained of abdominal pain of a very distressing character. A tumour was present in the lower abdomen gradually increasing in size, and no menstruation. The woman had been deserted by her husband.

Examination showed a movable tumour in the position and size of a five month's pregnancy. The vagina was shallow, about 1½ inches in depth, and a blind sac. The cervical end of the uterus could be felt separated by one and a half inches from the vagina, with which there was no connection. Bimanually the uterus could be tilted backwards and forwards the cervical end being freely movable.

A catheter in the bladder and a finger in the rectum were separated only by the bladder and rectal walls.

Two attempts were made by vaginal incision to bring the cervix down and unite it to the vaginal canal. These attempts were unsuccessful, owing to the contracted space, the difficulty of separation and the danger of opening the bladder or rectum.

Later the abdomen was opened and the uterus and tubes removed.

The operation presented no especial difficulty. The tubes were greatly enlarged and convoluted and looked like large pus tubes. The ovaries were small and appeared to be undergoing fatty degenerative changes.

Pressure on one of the tubes caused fluctuation in the uterus and opposite tube. The specimen has not been opened.

The patient had a normal convalescence and left hospital in three weeks completely relieved of her distressing symptoms.

### INTRAVENOUS IODINE

By HEMANDAS R. WADHWANI, M.B., B.S.,  
*Jacobabad, Sind*

LIEUTENANT-COLONEL FREDWIN has published a very interesting and most useful article on intravenous iodine in the December 1923 issue of the *Indian Medical Gazette* although much remains to be done as regards dosage, intervals between injections, contra-indications, complications, etc. I think that intravenous iodine will have one of the most prominent places in general therapeutics within the next few years, as the results obtained by all workers are very promising.

I have tried intravenous iodine on several cases and the results are exceedingly encouraging as can be seen from the following cases.

**Case 1**—Mrs. I. aged 22 was suffering from a very severe attack of phlegmasia alba dolens (white leg) for about three weeks when I was called to see her. The whole leg from the foot to the groin was very much swollen and double the circumference of the healthy leg, extremely painful and pitted on pressure. I at once gave her 1 cc of tinct iodine intravenously and advised frequent hot fomentations. Fever 101° which was already present rose to 102° F after about three hours without any rigors. No other inconvenience was felt. On the next day one-third of the swelling had subsided and the leg was much less painful. The swelling went on decreasing until on the fourth day when only half the swelling remained and another injection of 2 c.c. was given. This time there was a very good reaction after an hour. The temperature which was normal before injection, rose to 104° with severe rigors lasting for two hours. Within a week after this injection, the whole swelling had practically disappeared and no pain was felt at all.

**Case 2**—Perumal aged 35 got an attack of erysipelas of the scalp and face. The infection started from a wound on the forehead. The whole scalp and the face were swollen. The swelling of the left eyelids had reached considerable proportions, completely closing

the eyeball. Many vesicles and blebs had formed about the eyelids.

The patient was admitted as an indoor patient. I gave him 1½ c.c. of tinct iodine intravenously immediately on admission. Ichthyol mixed with lanolin (50 per cent) was locally applied. There was no reaction. On the next day the progress of the rash, which before the injection was steadily advancing down towards the neck, stopped, and the swelling also subsided. Multiple incisions were made round the eyelids, as it was a cellulito-cutaneous type of erysipelas. The original wound was enlarged. On the fourth day a second injection of 2 c.c. was given. This time also no reaction was seen. But the progress of the case was excellent, as within a week after this injection the whole swelling had practically subsided. The skin over the upper eyelid of the left eye became gangrenous and the whole patch of gangrene came out as a big slough. Many sloughs came out of the incised wounds also. A third injection of 2½ c.c. was given after an interval of 8 days. After this injection the wounds became quite healthy and no more sloughs were seen.

**Case 3**—Mrs. H. aged 25, was suffering from a severe type of pelvic peritonitis, which was the result of puerperal infection. The whole abdomen was distended very painful and tender to the touch. She was given 1½ c.c. of tinct iodine intravenously. There was a very good reaction (fever 103°, with severe rigors). On the next day abdominal distension, pain and tenderness were much less in proportion. On the fourth day a second injection of 2 c.c. was given. This time she had a slight reaction. However the condition improved to a great extent, within a few days the abdominal swelling had subsided. No pain and tenderness were present except in the left iliac region where a hard lump was felt. On vaginal examination pus was found to have formed in the left Douglas's pouch. The abscess was opened *per vaginam* and a large quantity of pus evacuated. After a fortnight the patient recovered.

**Case 4**—S. K. aged 10 years was suffering from tuberculous disease of the right hip joint. The leg was apparently shortened. Two abscesses were threatening to form one in front of and the other above the great trochanter. The joint was swollen and extremely painful. The patient was admitted as an indoor patient. Weight extension was applied to the affected leg, a Histon's splint to the sound leg and Scott's dressing to the joint. Four injections (each of 1 c.c.) of tinct iodine were given intravenously at intervals of from 5 to 10 days. During the intervals sodium morrhuate was injected. Within these four weeks the pain and swelling disappeared, and both the abscesses subsided. Weight extension was done away with, and the patient was made to walk with the help of crutches and a Thomas's hip splint. The boy is still under treatment and progressing very favourably. He will be given one or two more iodine injections and about a dozen more sodium morrhuate injections as he is still getting occasional temperature between 99 and 100° which is the only bad sign left.

Some cases of threatening ischio-rectal abscesses, which are met with here as frequent puerperal complications, were given intravenous iodine. The abscess subsided even after the first injection. Several cases of such abscesses, who were not given iodine injections (as they had occurred before I knew of the injections) lingered on for some months with very severe pain until pus formation and the subsequent opening of the abscesses. Some other big threatening abscesses (cervical, mastoid, etc.) were also aborted by iodine injections.

Intravenous iodine was also tried on several cases of septic wounds and corneal ulcers. The course of treatment was very much shortened. On the whole the results were most encouraging.

Very few cases amongst those on whom I tried the iodine treatment showed disappointing results. But even these could not be said to be conclusive as they were only single instances. The cases were—otorrhœa with chronic inflammation of the middle ear, primary pulmonary tuberculosis, chronic arthritis and acute meningitis.

#### CONCLUSIONS

*Dosage*—Large doses are certainly far better than small ones. The maximum dose I have given is 2½ c.c. But I think one could go up to 3 c.c. without any harm. Weak and anæmic persons should be given smaller doses.

*Complications*—Almost all the difficulties and complications have been dealt with by Jeudwine in detail. He lays particular stress upon the occurrence of thrombosis after intravenous iodine injections. He has therefore devised an improved technique which is to inject saline into the vein before and after the iodine is introduced. In my experience there is hardly any necessity to employ such a complicated apparatus and process. To date I have given about 100 such injections, but thrombosis occurred in the first two or three cases only. In no other case after that did any thrombosis occur.

As regards *reaction*, I have seen that it has nothing to do with the result of injection. Some cases who do not get any reaction at all show great improvement, and some who get very severe reactions do not show any improvement. But most of the cases get a reaction both with good and bad results.

*Iodism*—I have noticed one peculiar thing in this respect. A few cases who could not tolerate even 5 grains of potass iodide by the mouth and who got a severe attack of iodism, did not show any symptoms of iodism after intravenous injection of 2 c.c. of tinct iodine except perhaps a little itching over the whole body. In my opinion, it is the alcohol in tinct iodine which plays some part in preventing iodism. I think it is always better to inject tincture of iodine (B. P.) instead of a watery solution of iodine or any other proprietary drug containing iodine.

#### A CASE OF ANEURYSM OF THE EXTERNAL CAROTID ARTERY

By HEMANDAS R. WADHWANI, M.B., B.S.,  
Jacobabad Sind

THE photograph depicted is that of a male child, 10 years of age who came to hospital with a tumour of the neck. He had been an

idiot from birth, as is well shewn by the facies. No signs of congenital syphilis could be found, whilst the parents denied all history of syphilis. (The Wassermann reaction was not done).

The tumour commenced two or three years ago as a small mass the size of a strawberry, near the angle of the jaw. It increased until



Aneurism of the External Carotid,

it reached the size of a small mango. On examination it was found to be a typical sacculated aneurysm of the external carotid, a thrill being felt as the stream of blood entered the sac, and a loud harsh bruit being audible on auscultation. The boy bolted from hospital immediately after the photograph had been taken.

#### MASTOID SUPPURATION WITHOUT TYMPANIC PERFORATION AND SUPPURATION

By K. P. RAMAN PILLAI, M.B., F.R.C.S. (Edin),  
Deputy Surgeon General Hospital, Tirvandrum

K., a child aged seven months, was brought to hospital for a small swelling behind the left ear. The mother stated that the child had been crying without appreciable cause for ten days, and that whenever the left side of the head was touched, the child cried more. A week after onset a small swelling appeared behind the left ear, and for the first five days there had been fever.

On examination, on the 19th December, 1923 the left mastoid region was found to be cedematous and very tender, with the left pinna pointing. The left external meatus was

slightly oedematous in its posterior wall and narrow, on thorough cleansing there was still some wax in the ear, and the upper half of the membrana tympani was seen to be slightly inflamed, but no perforation could be detected. The general condition was good. The patient was admitted to hospital, the mastoid region painted with iodine, and a hot water bottle applied. A stimulant expectorant mixture was also given as rhonchi were heard in the lungs.

By the 27th, the swelling became more circumscribed, but the tympanic membrane was quite intact and not bulging. On the 28th, under chloroform anaesthesia the ear was carefully examined, the tympanic membrane was slightly inflamed in its upper half, but quite intact. The mastoid region was exposed by a curved incision, and much pus found under the pericosteum. The antrum was laid open with a gouge and pus and granulation tissue found inside it. The cells were cleared as completely as possible and the cavity packed with iodoform gauze. The after-history was unimportant and the child made a sound recovery.

The special feature of the case was inflammation and suppuration in the mastoid antrum unaccompanied by perforation of the tympanic membrane and with no marked signs of otitis media. An operation for tonsils and adenoids was also advised but so far the mother has not consented to this.

## SPECIAL ARTICLE

### ANTE-NATAL CARE

An address on "The New Midwifery" at the All-India Baby Week Conference in Calcutta

By V B GREEN-ARMYTAGE, M.D. M.B. B.S.  
MAJOR I.M.S.

Second Professor of Midwifery and Gynaecology,  
Medical College, and Second Surgeon Eden  
Hospital Calcutta

Ladies and Gentlemen,

In Europe in days gone by it was the rule, as you know, rather than the exception for one, two, or even three children of a family to die at birth or shortly after but those were the days of large families and little thought was attached to such occurrences, and if you are acquainted with the Victorian novelists, such as George Eliot, Jane Austen, or the Brontës you will remember that mystery or disease always surrounded the expectant heroine, indeed in those times so often was calamity associated with childbirth that one wonders if it was not the inscrutable purpose of the Almighty to destroy the mother more or less on

the same lines as the salmon, which dies after spawning.

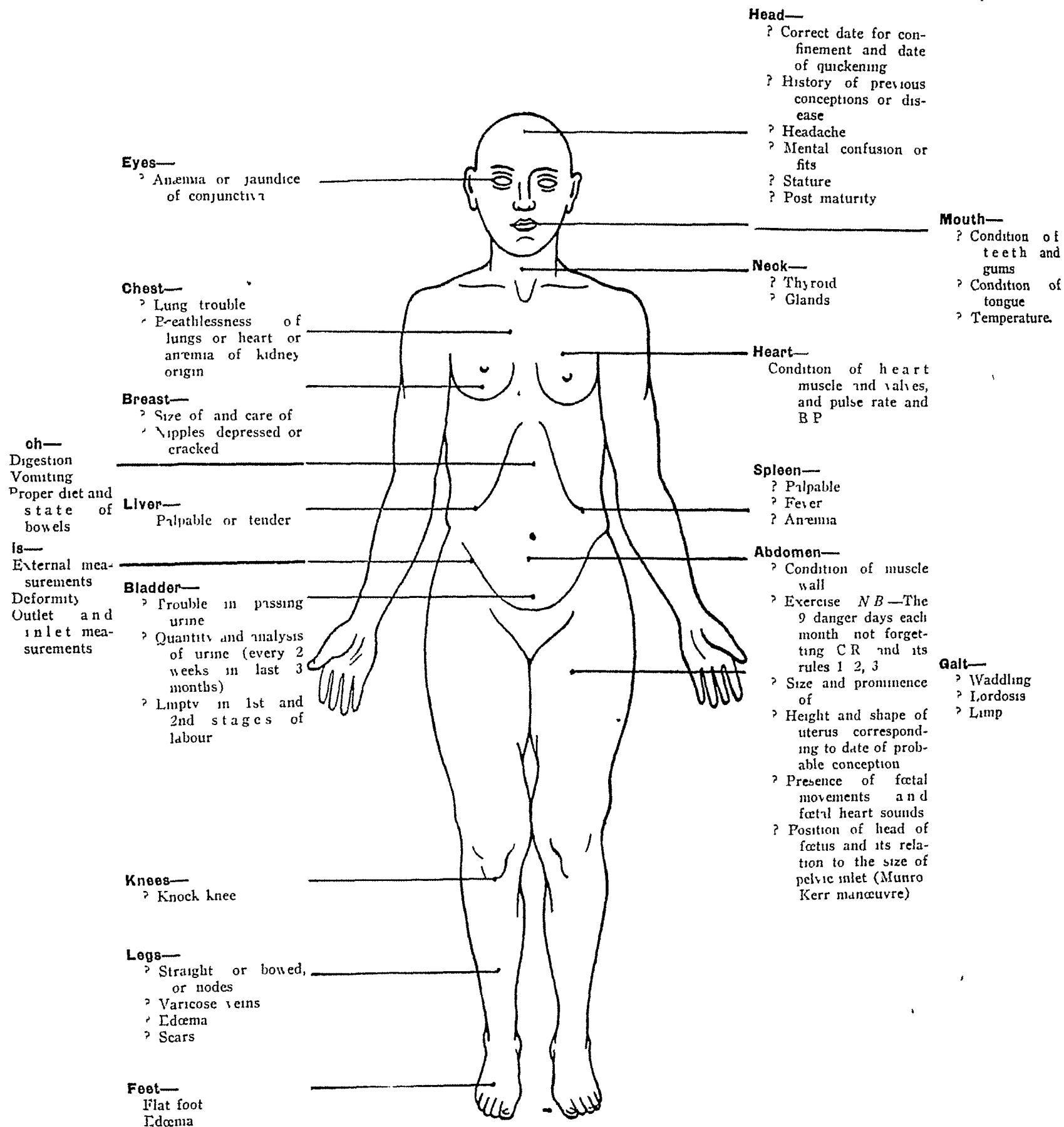
To-day, however, small families are the rule rather than the exception—quality being aimed at rather than quantity—therefore it is our bounden duty to preserve the life of both mother and child with the least degree of damage, financial and physical.

In the West these principles, rightly or wrongly, are firmly engrafted, but what about the East? Are you aware that tens-of-thousands of women and children die yearly in India of preventable diseases and accidents during pregnancy and parturition? Do you realize that these women feel sorrow and pain in exactly the same way as you and I? The Countess of Reading and the Countess of Lytton are stimulating us to take a greater interest in child-welfare, but what I want to impress upon you this afternoon is, that the title *Baby Week* infers a greater item, namely *babies before birth* for we must do something radical to stem the fearsome maternal and child mortality and morbidity in India, and this *something* is what is designated as *the new midwifery*.

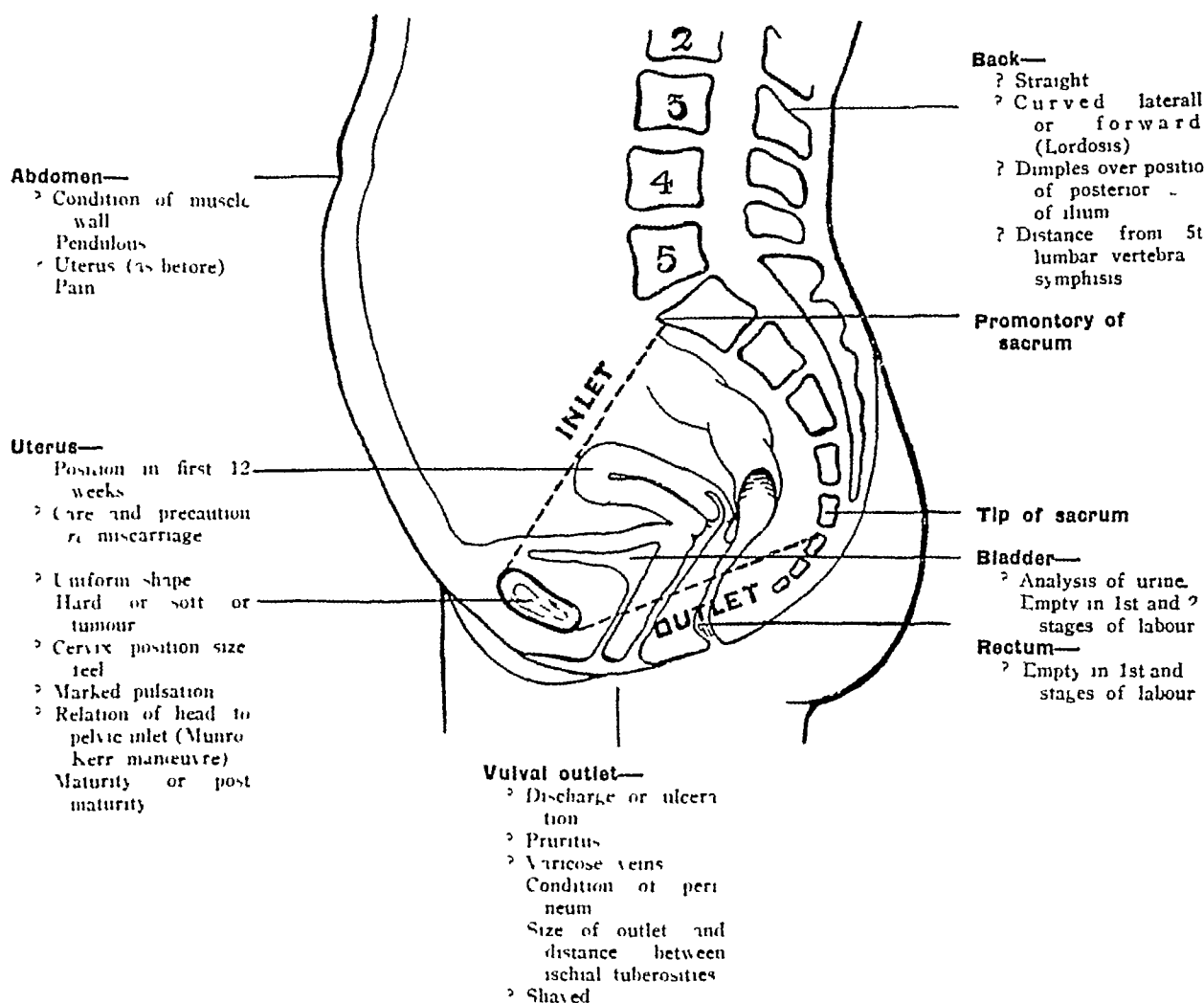
It is no use catering alone for the sick child after it is sick, or after it has been born into the world of a sickly mother—your baby clinics do that and do it well, but what we must do, is to develop a far, far more important scheme that of *ante-natal care*, and personally I see no reason why we should not collaborate with our welfare clinics by attaching to each centre an *ante-natal* department which will be worked by efficiently trained doctors, nurses, district visitors or *dhas*.

In England this is being done, and the model for Calcutta to follow is that of Shoreditch which, as you know, is one of the poorest and most densely populated areas in London. The expectant mother by advertisement and propaganda, is advised to attend the clinic every week or month from the moment of known conception up to her full term, a crèche for other children is possibly provided, and the mother is seen by expert midwives and thereby advised, cared for, and guarded against illness and accident from the beginning till the end. Such a system we can easily develop in Calcutta, and, if only in a modified form, we can teach some of the principles of *ante-natal care* to a band of trained workers, so that a time will arrive when the wonderful results of such care will be appreciated by the masses in India in the same way as they are now being appreciated by the poor in England.

In such a manner we shall not only promote health but shall also prevent a vast degree of suffering, for then healthy mothers will bring healthy children into the world with a minimum amount of trouble and difficulty and will be able to nurse their own babies, for it is hardly necessary for me to tell you that,

**ANTE-NA***A Scheme of Enquiry for the Prevention of Troubles*

## Ant Mother and Neo-Natal Infant

**INLET—**

- ? Distance between sacral promontory and top of symphysis
- ? Relation of foetal skull to inlet
- ? Engagement fixation or overlapping of foetal skull

**OUTLET—**

- ? Antero posterior distance between symphysis and tip of sacrum
- ? Transverse distance between ischial tuberosities

*NB*—The huge importance of every expectant mother being examined with reference to the relationship of the foetal skull to the pelvis in the 36th or 37th week of pregnancy ? Vertex presentation ? Overlapping of big head ? Small pelvis

**? 5 Cardinal points**

- (1) Relation of foetal head to pelvic inlet and outlet
- (2) Whether maximum circumference of foetal head is fixed
- (3) Whether head is flexed
- (4) Where are back and limbs?
- (5) Condition of outlet

**P 5** ? Care of neo-natal infant.

if such a mother can nurse cleanly her own baby, that baby will not develop those complications which bring them in thousands to our welfare clinics, moreover, the instructed nurse, district visitor, or *dhai*, will be able to instil into the mind of the mother during the carrying period the principles and art of the care of her baby when born, for I would remind you that in England every expectant mother is asked to attend the clinics once a month for advice and detailed examination—more or less as in my diagram—and then after birth mother and child are referred to the post-natal centres and workers.

The scheme which I am handing round to you this afternoon entails no great tax on the mentality of the average doctor, nurse district visitor, or *dhai*. With the great assistance of Mr Harvey of the Baptist Mission Press I have drawn up a diagram with a whole series of queries and I can assure you that given average material to work on, one can guarantee to instruct any group of volunteer workers, for my object is to impress upon you the fact that, given average material, all that we have to do is to train female 'Sherlock Holmeses' who will, during the carrying period become sleuth-hounds in the prevention of disease and accident, and if in the quiet of your room those of you who are trained will study this diagram you will see that it covers the whole gamut of the symptoms or diseases which may afflict a woman during pregnancy.

To the properly taught and trained mid-wife complaints in regard to any one of these queries should at once put her on the *qui vive* as to the cause and prevention of trouble, and if she was in any doubt or perplexity she would at once, in India as in England, refer the matter or the patient for competent medical opinion.

The only real difficulty in the training of workers is in getting them to appreciate the size of the foetal head and its relation to the pelvis.

Let me make my meaning clear by showing you these specimens. Here is a normal pelvis with a normal baby's head, you will see that the baby will pass into the world without difficulty in 96 per cent of cases, but look at this pelvis contracted in its inlet, and you will see that a normal-sized baby's head cannot possibly pass, with the result that the baby or mother or both, will perish if not properly treated—as indeed occurred in this particular specimen, but had this patient been observed in her early days, the various anomalies associated with contracted pelvis would have been spotted, and had she been seen in her thirty-seventh week, the probabilities are that labour would have been started early or Cæsarean section advised and the baby born alive, and the mother saved. Such are gross

anomalies which, if the scheme were understood, any competent worker would be able to foresee and prevent. But please do not imagine that *ante-natal care* means solely spotting such rare conditions as contracted pelvis, there are things far more common—for instance, the prevention of breast abscess, and inability to nurse the baby, the early recognition of an enlarged spleen, or tubercular glands or diseased heart in pregnancy, the identification of the fact that the baby is a breech rather than a head presentation, that the abdomen is pendulous, or that there is œdema of the legs, or that urination is scanty, or that there has been a previous miscarriage or difficult labour.

These are only a few of the hundred ways in which a properly organised system, with an efficiently instructed class of workers, can do an immense service to labouring mothers in India. Indeed I would go so far as to say that if a group of workers will come forward one can guarantee to train them in such a way that they may propagate the gospel of the prevention of troubles in expectant mothers.

Up to date little has been done in India on these lines, for ignorance and caste prejudice are a zareba around the expectant mother, but this zareba is one which any group of *women workers* co-operating with the nearest male or female doctor can penetrate, and in my humble opinion, *ante-natal clinics* are of more imperative importance than welfare clinics for in our Indian Empire we must endeavour, be it through women or men workers to remedy and stem the present enormous maternal and foetal mortality and morbidity. For the success of this scheme or system which I am advocating, three things are necessary,

- (1) *Propaganda*
- (2) *Efficient training*
- (3) *Co-operation*

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## Reviews.

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**DIPHTHERIA, ITS BACTERIOLOGY, PATHOLOGY AND IMMUNOLOGY.** By Sir F. W. Andrewes, D.M., F.R.S.; Professor William Bulloch, M.D., LL.D., F.R.S.; Capt. S. R. Douglas, F.R.S., late I.M.S.; Professor G. Drever, C.B.E., M.D., F.R.S.; Dr A. D. Garner; Dr Paul Fildes; Dr J. C. G. Ledingham, C.M.G., D.Sc., F.R.S.; and Dr. C. G. L. Wolf, M.D., London; Medical Research Council Series. H. M. Stationery Office, 1924. Pp. 544. 4 colour plates. Price 12s 6d net. (Obtainable from Messrs. Thacker, Spink & Co., Calcutta, and all agents for Government Publications.)

ANYONE who has to do much reviewing of books for medical journals is apt to think that America is winning the peace as well as the late war. The output



of American medical books profusely illustrated, beautifully printed and authoritative is enormous, the smaller output of British standard works seems in danger of submersion.

Yet no one need have any despair in reality concerning the state of British medicine. Called into being by the urgent necessities of the war, the British Medical Research Council represents the very acme of British medical and pathological skill and its series of splendid monographs on different subjects represents the finest of British medical work. The future of British medicine may well come to live very largely with this Council, its beneficent labours during the war and during the subsequent peace are of incalculable benefit to the nation and the Empire. That this new work of the Medical Research Council Series is authoritative may be seen from its galaxy of authors, —a galaxy which includes no less than five Fellows of the Royal Society and most of the leading British authorities on the disease. Its general get up and the beautiful colour plates leave nothing to be desired. Finally its price is studiously moderate for so large a volume: it includes a selected but exceedingly useful and very complete bibliography. Lastly by a happy touch it is dedicated to Dr Emile Roux who discovered the toxin of the diphtheria bacillus and in recognition of that medical—as well as political—*intelle cordiale* whose foundations were laid by Louis Pasteur and Lord Lister.

It is difficult to review such a work adequately. At one time the bacteriology of diphtheria might have been regarded as almost a closed subject; yet, in the 15 years which have elapsed since the publication of Nuttall and Graham-Smith's monograph on *The Bacteriology of Diphtheria* the advances in knowledge have been enormous. Also in common with most of the work of the war and post-war years, such knowledge is scattered throughout the medical research journals of the past ten years, it has hitherto been accessible only to the earnest student who was prepared to wade through voluminous card indices and the *Index Medicus*. In this volume the whole subject has been precisely revised, re-written and incorporated in one complete and fascinating volume. "The facts and principles involved were debated in detail by the Committee as a whole, often with the result that much or even the whole chapter had to be re-written only to undergo a repetition of the process of criticism: we learn from the preface. The book is not merely a critical review of previous work on diphtheria. Gaps in knowledge are filled up by the inclusion of some pieces of work hitherto unpublished. We have spared no pains to render the monograph as complete a presentation of the subject as possible while accuracy of detail has been ensured by consultation of the original sources throughout. We have indicated how and to what extent the scientific facts may be utilized in the practical control of the disease. We believe that the bibliography contains practically every paper of scientific value which has appeared on the subject up to the time of writing. We trust that this exposition of the existing state of knowledge in regard to diphtheria may prove of use to the medical profession and to scientific workers generally. It will at least indicate how imperfect some of this knowledge is even at the present day and may serve to stimulate further research upon the problems as yet unsolved." It will be clear we think that this book is not merely one for the laboratory worker to whom it is essential, it is also a work for the public health official, the military medical officer, and the administrative medical director.

Chapter 1 deals with the history of diphtheria. Here—as with many other diseases, the causative micro-organisms of which are known—four periods are discernible, the era of clinical observation, a second pathological-anatomical period, a third, with the discovery of the causative bacillus of the disease, experimental and aetiological, a fourth, the era of serum-

therapy and the Schick test—of applied scientific knowledge to the treatment and control of the disease.

Chapter 2 deals with the *Corynebacterium diphtheriae*—as we must now learn to call the Klebs-Löffler organism. Its morphology as seen in direct smears and cultures, its cultural characteristics and staining reactions are discussed in detail. The modifications of Neisser's method are given in detail and a full-page colour plate illustrates this section. Gram's modification gives perhaps the best results whilst it is important to note that the diphtheria bacillus may show partial decolorisation with Gram's stain unless the technique adopted is a standardised one. The special media for cultivation are next considered.

Chapter 3 deals with the toxin of the diphtheria bacillus. Here the discussion is very detailed—as is necessary such factors as sugar-content of the medium, reversibility of action, relation of surface tension to growth, the relationship of peptone to toxin formation, preservation and concentration of the toxin are considered. In chapter 4 diphtheria antitoxin and other antibodies are considered, methods of preparation, purification and concentration, testing in all its details, the interaction of toxin and antitoxin and the relationship of strength of antitoxic content to therapeutic efficacy are discussed. Chapter 5 deals with the pathology of diphtheria both as a natural disease in man, and experimental diphtheria in the guinea-pig and other experimental animals. We note in passing that the popular connection between human diphtheria and diphtheria in cats is very far from proven. Chapter 6 details the laboratory methods in diagnosis, the collection of material for examination, the immediate presumptive diagnosis by direct film examination, the confirmation by cultural methods and the full confirmatory diagnosis including the virulence tests. Here it is interesting to note that the swab should first be *cultured*, the direct film taking the second place. Chapter 7 deals with the serum treatment of diphtheria giving details of its practical application, evidence of first-rate and second rate value of its efficacy, the accidents of serum treatment and their treatment. Chapter 8 deals with immunity, a very big subject. Age of course has a profound influence, persons of from 2 to 15 years of age being the most susceptible. In chapter 9 the virus itself as a factor in the incidence and spread of diphtheria is considered, the relation between virulence and spread, the technique of the virulence test, the localisation and survival of the bacillus as a factor in infection, including the very difficult subject of carriers, and the mechanism of spread. In chapter 10 the question of prevention is dealt with. Passive immunisation by the injection of anti-serum is a weapon for serious emergencies and may only give immunity for three weeks. Immunization with toxin has been considered too dangerous and the usual procedure now adopted is immunization with toxin-antitoxin mixture, or the administration of toxin-antitoxin mixtures to such persons as show a positive Schick reaction. In this chapter is included much valuable writing and very clear instructions, the three colour plates of positive pseudo-positive and negative Schick reactions being especially valuable. Disinfection of objects and carriers again a most difficult subject, is dealt with in five pages. The volume closes with chapter 11 on the diphtheroids and here questions of virulence and of sugar reactions of possible symbiosis with the true diphtheria bacillus, and of morphology receive careful attention, the last point being illustrated by a series of very clear microphotographs from cultures. A very complete index of both authors quoted and subjects mentioned completes the volume. There is not a redundant word in the whole volume, however.

We have perhaps said sufficient to indicate the enormous and authoritative value of this volume in general laboratory and public health practice. No laboratory worker, no public health official, and no general practitioner who is called upon to treat cases

of diphtheria can afford to be without it. In India diphtheria is usually considered to be a disease of hill-stations, and especially of boarding schools in such stations. Yet the recent work of Vardon has shewn that the carriers in a general Indian population number some 5 per cent of the population, whilst the disease is always endemic in the larger cities of India. Such a volume as this, presenting a mass of collected and digested information on the disease in its every aspect, nowhere else accessible in so convenient a form, is certain of a warm welcome by a wide circle of readers.

**THE ANTIDIABETIC FUNCTIONS OF THE PANCREAS AND SUCCESSFUL ISOLATION OF THE ANTIDIABETIC HORMONE INSULIN.—**  
**By Professor J. J. R. Macleod and F. G. Banting, University of Toronto. St. Louis: the C. V. Mosby Co. 1924. Pp. 69, figures 3. Price \$ 1.50.**

THE literature upon the subject of insulin is already enormous, yet the publication of this little book is especially welcome. It consists of a series of three lectures to the Wayne County Medical Society by Professors Macleod and Banting, the pioneers of insulin to whom was awarded the Nobel prize in 1922 a prize which, we may add, they divided with their co-workers Drs C. H. Best and J. B. Collip. Inasmuch as these three lectures are thus the most authoritative of the subject they are of peculiar

Professor Macleod first deals with the historical aspect of the subject. Brunner, 1862, was the first person to demonstrate that the pancreas is necessary for carbohydrate metabolism and that polyuria and extreme thirst follow on extirpation of the pancreas in the experimental animal. Claude Bernard in 1856, however, was the first person to give a complete exposition of the role of the pancreas in both carbohydrate, protein and fat metabolism, an exposition so complete that subsequent work has added but little to it. Minkowski, in 1889, produced severe diabetes in the dog by extirpation of the pancreas, whilst Langerhans had discovered the islet tissue, which means so much to humanity, some twenty years previously. In 1895 Sir E. Sharpey Schafer suggested the association of pathological changes in the islands of Langerhans with diabetes mellitus, and the opinion gradually took shape, but was as yet non-proven, that diabetes is due—in some instances at least—to the want of an internal secretion or hormone, manufactured by the islet cells.

The proof of this hypothesis could obviously only be afforded by shewing, not only that diabetes ensued on removal of the pancreas, but that it could be cured by administration of an extract of the hormone in question. In 1908 Zuelzer very nearly solved the problem. An alcoholic extract was prepared from the pancreas, which removed the hyperglycæmia and glycosuria produced in experimental animals after administration of epinephrin. Unfortunately when tried on eight diabetic patients, although decidedly favourable results ensued in five, yet toxic results were reported in other clinics and the idea was abandoned. Also repeated efforts on the part of Rennie, Fraser and others to cure diabetes by administration of pancreatic extracts resulted in a want of success.

In 1912 Knowlton and Starling established the fact that in a diabetic dog the heart muscle consumes sugar at a much slower rate than does the heart muscle of a normal control, but that when a pancreatic extract, made with weak acid was perfused through the heart-lung preparation the sugar consumption came up to normal. E. L. Scott in the same year prepared active alcoholic extracts of the pancreas, but the extracts proved toxic. A. H. Clarke perfused the excised pancreas of an animal immediately after death with Locke's fluid and then perfused this fluid through an excised heart preparation, the rate of sugar consumption was much higher than if Locke's fluid which had

not been so perfused was used, thus indicating that the pancreas had an internal secretion which affected the rate of sugar metabolism.

The work of earlier investigators, however, was hampered by their failure to free the islet tissue of the pancreas from its secretory acinous tissue. Recent histological studies by Bensley and others shew that the islet tissue is in close relationship to the outer layer of the cells of the ducts, also it has a particularly rich blood supply. Having devised an injection technique which differentiated the islet tissue, Bensley was able to shew how rich it is, in the pancreas of the guinea-pig for instance there are some 25,000 islets. If the pancreatic duct be ligatured then, one would expect that the acinous cells would be the first to degenerate leaving the islet tissue almost isolated. The actual changes which do occur after such ligature, however are different, at first the acinar cells degenerate as expected but later they shew an attempt at regeneration, followed by degeneration again. The islet tissue at first degenerates being invaded by connective tissue but then proliferates. In one rabbit it was not until 533 days after ligation of the duct that the residue of pancreas consisted entirely of regenerated islet tissue. Hence in preparations of pancreas tissue after fairly recent ligation of the duct, there are present proteolytic ferments liberated by the breaking down of acinar cells which destroy the antidiabetic hormone insulin. And it is upon this basis that Banting and Best's original experiments rest.

Work was commenced by ligating the pancreatic duct in a number of dogs. An interval of from 7 to 10 weeks was then allowed for degeneration of the acinous tissue, and histological examination shewed that the acinous tissue had been replaced by fibrous tissue. The degenerated remnant was then minced in ice-cold Ringer's solution frozen and filtered. The filtrate was tested by intravenous injection into de-pancreatised dogs. Such de-pancreatised animals usually die in some 8 to 10 days after the operation, their blood sugar rises to a very high level, as much as 0.450 per cent being reached on the 5th or 6th day, and the wound usually fails to heal whilst glycosuria is present. In the first set of experiments, the filtrate markedly improved the condition of such dogs, they lived longer and the injections were followed by a sharp fall in the blood sugar content.

But little of the newly isolated preparation insulin was available by such methods however, and resource was next had to the pancreas of unborn foetal calves. Here the acinous cells have not yet become active, whereas there is abundance of islet tissue. The results were better, the dogs lived up to 21 days, one even shewed symptoms of hypoglycæmia after injection. Finally came the first chemical method of isolating insulin. Adult beef pancreas was macerated with slightly acidified absolute alcohol, filtered and the filtrate evaporated to dryness *in vacuo*. A whitish precipitate of the active principle, insulin, results. This was tested clinically on three patients, in the first it caused a 30 per cent reduction in the blood sugar and a marked reduction in the urinary sugar. Subsequent improvements in technique and methods have now rendered the wholesale supply of insulin at comparatively low prices possible.

Turning to the experimental side of the trials Professor Macleod points out that fresh extracts of whole pancreas contain not only insulin but a pressor base allied to epinephrin, which tends to cause a rise in blood sugar content on injection, hence they are particularly unsuitable. How insulin acts is still a problem awaiting complete solution, although more and more light is steadily being shed upon the subject. The first and present method of assay is upon the rabbit introduction of sufficient insulin to reduce the blood sugar of a rabbit (starved for 24 hours before testing and of 2 k gm weight) to 0.045 per cent. is followed by convulsions and death accordingly this

amount is taken as the unit rabbit dose, and the preparations standardised accordingly. The alarming premonitory symptoms can be recovered from, however, and the animal's life saved if glucose be given intravenously or orally, or if orange juice be administered, or if adrenalin be injected hypodermically. Laevulose and galactose have a similar but much weaker effect, other sugars such as cane sugar and lactose have no effect. Clearly then, after the injection of insulin there is a "burning up" of glucose in the body.

Hyperglycæmia can be produced experimentally in animals in three or more different ways, by puncture of the floor of the fourth ventricle in the medulla—(pique)—by subcutaneous administration of epinephrin, and in asphyxia due to anesthetics or administration of carbon monoxide. In all three conditions insulin is very successful in preventing the onset of hyperglycæmia. Hence, as a side issue, insulin is likely to be very valuable as greatly lowering the well-known dangers of administering anesthetics for surgical purposes to diabetics.

In experimental diabetes the body has lost the power of oxidising carbohydrate; the respiratory quotient falls to about 0.7 and it does not increase if an increased amount of carbohydrate is given. But if insulin, together with sugar be given to such an animal, the respiratory quotient immediately begins to rise towards unity; in one experiment it rose from 0.7 to 0.91 in 57 minutes; in another to 0.93 in 97 minutes. Insulin therefore restores the lost power of oxidising carbohydrates. In a normal animal the glycogen content of the liver varies from 7 or 8 to more per cent; it may even be as high as 20 per cent if the animal be fed on a diet containing much sugar. In the diabetic animal the content is always below 1 per cent. If insulin and sugar be given to such an animal however, the glycogen content of the liver steadily mounts up; in one instance indeed it reached the very high level of 20 per cent. Insulin therefore restores the glycogen-storing activity of the liver.

In diabetes the migration of fat becomes abnormal, the liver empty of glycogen becomes loaded with fat, and the blood lipæmic. Under insulin treatment, however, the fat disappears from the liver, just as glycogen takes its place and the lipæmia very quickly clears up. Fat and carbohydrate metabolism go on together in the body and if there be no carbohydrate fires the fat smokes and the smoke is represented by the acetone bodies, which have a toxic influence. Insulin clears up this condition.

Summing up, Professor Macleod suggests that it appears that the effect of insulin is to convert glucose into some substance intermediate in metabolism between the three great groups of metabolic proximate principles—carbohydrates, fats, and proteins. After the insulin effect has begun to wear off the blood sugar begins to recover and the rate of recovery is in general proportional to the amount of available glycogen in the liver. In practice, therefore, insulin administration should not be carried out at random. It is first necessary to ascertain the patient's tolerance for glucose after placing him on a fixed diet. If the patient becomes sugar-free on a basal requirement diet, and can metabolise 600 to 700 calories over and above his basal caloric requirements insulin is perhaps unnecessary. The first injection is the only one where there is appreciable risk; if the patient's liver has not the necessary stores of glycogen, hypoglycæmia, leading to convulsions and a critical condition, may ensue later as the glycogen storage improves under successive injections, there is no risk. It is advisable, therefore, to commence with small doses and gradually increase until the blood sugar is reduced to the normal level, and the patient is rendered sugar-free.

Finally, another possibility presents itself. A better method of assay may become available. (In India, as recent articles and correspondence in our columns have shewn, the rabbit test is not entirely suitable for assay.) A given degree of hyperglycæmia may be produced by

the injection of fixed amounts of epinephrin, and it is possible to overcome such hyperglycæmia by injections of insulin. In other words it may be possible to work out a technique by which insulin can be assayed in terms of epinephrin units. Yet, even with the present method of assay on rabbits in terms of rabbit-units, occasional aberrant results are encountered, and the work is not free from difficulties.

The fear is sometimes expressed that the diabetic, once started on insulin treatment, will have to continue the injections throughout his life. Here, experimental facts suggest the contrary. In diabetes the islet tissue is worn out and is subject to an increasing strain. The insulin injections appear to relieve it of this strain and to give it rest. Also the islet tissue shews great powers of recovery and regeneration, hence it is possible that under insulin treatment, the islet tissue may recover, and the necessity for continued insulin injections be done away with. This would be especially the case in the diabetes of childhood, at present the most difficult type of case at all to deal with.

These lectures were delivered on January 29th–30th, 1923 and there has already been much further work on insulin. Yet they deserve the close study of every laboratory worker and practising physician in India, since they have so special a bearing upon one of the most important of Indian diseases. Further, it is not only in connection with diabetes that insulin therapy is coming into use in India, in sprue the treatment has often considerable value. The pancreas is possibly subjected to more strain under tropical than under temperate conditions, an unsuitable diet rich in meat during the hot weather often accounts for many intestinal derangements in Europeans in India. Insulin is bound to be increasingly used in Indian practice, it is important that the fundamental principles underlying such therapy should be understood, and this little book is the most authoritative guide upon the subject.

**HAND-ATLAS OF HUMAN ANATOMY**—By **Werner Spalteholz, Professor of Anatomy in the University of Leipzig.** Edited and translated from the 7th German edition by **L. F. Barker, Professor of Medicine Emeritus, John Hopkins University.** 4th edition in English, 1923. 3 Vols. 902 pp. 994 plates. Philadelphia and London: **J. B. Lippincott Co.** Price, 70s net. Obtainable from **Messrs. Butterworth & Co., Calcutta.** Price, Rs. 52-8 net.

This magnificent atlas should be in the hands of every anatomist and every practising surgeon. Printed upon thick glossy paper, and representing the last word in clearness and beauty of illustrations, it can hardly have a competitor. At the John Hopkins University it has become the favourite book with students in anatomy. The student of anatomy meets with considerable difficulties, he should acquire as much knowledge as possible of a region before he begins to dissect it, yet it is only by the dissection itself that he acquires such knowledge. It follows therefore that pictures of dissections, true to nature, aid the student enormously and thus guide his work from the unknown to the known. This desideratum Spalteholz's atlas fully meets.

The plates are magnificent, there can be no other word for it. Where the difficult subject of the bones of the cranium is dealt with a clear full-page plate of the skull from each of its aspects is followed upon the opposite page by a coloured diagrammatic sketch of the same, and this system is adhered to throughout the volumes, thus muscle insertions and origins are shewn on one page as they appear in photographs of the bone, on the opposite page in coloured diagram.

A text accompanies the plates, but the author states that he undertook the writing of this text unwillingly, as he intended the atlas to be a supplement to and not a substitute for text-books on anatomy. Yet—as it stands—the text is very fully complete. Everywhere

the hospitals for this special purpose, a matter in which Colonel Austen Smith pleads for philanthropic co-operation 476 cases of snake-bite were reported during the triennium, with a mortality of only 94 per cent

The financial condition of almost all the hospitals in the province—with the exception of the State-aided institutions—was far from satisfactory. The number of such institutions, the cost of establishment, medicines, diet, etc., are all increasing year by year, and the local bodies are experiencing much difficulty in providing sufficient funds to meet the increased expenditure. The total income (excluding opening balances) in Classes I, III and IV, for which alone financial statements are received, amounted to Rs 17,54,636 in 1922, as against an average of Rs 13,51,375 in the preceding triennium. The Government contribution was about 4 lakhs, Local Fund contributions 9½ lakhs, Municipal contributions about 1½ lakhs, and other subscriptions over 1½ lakhs. In addition to the usual recurring and non-recurring grants government distributed a special grant of 3 lakhs in 1921-22 and 2 lakhs in 1922-23 towards the capital cost of the establishment of new hospitals and dispensaries in rural areas was given.

The Local Funds are doing their utmost to help in maintenance, whilst there was a gradual increase in the funds contributed by district boards. The whole financial aspect however, cannot be considered satisfactory, and Colonel Austen Smith makes a strong appeal for private donations and help in the cause of medical relief in the province. The average cost of diets was 4 annas per head per day, as against a previous average of 3 annas, but even at 4 annas, the provision is inadequate.

The most long-felt want in the province is adequate arrangements for nursing in the larger hospitals. In most of the hospitals nursing has to be left to relatives and coolies. At present there are altogether 49 matrons and nurses serving in the hospitals and dispensaries in the province, but a wide extension of the nursing service is urgently needed.

During the triennium a decided advance was made in giving medical aid to women, most of the larger hospitals in the province now have women doctors to look after the female side and there are large hospitals for women only at Bettiah, Gaya, Bhagalpur and Hazaribagh. The Countess of Dufferin Fund is very active in the province, and by careful financing the annual income is now such as to be able to give substantial aid to many hospitals. Some 50 trained midwives and *dais* are serving in the province, and the Legislative Council in 1922, passed a resolution urging the provision of trained *dais* in all rural centres. At present the chief difficulty in meeting such a demand is the very limited number of trained *dais* available. The total number trained in the classes held was 405 at the end of 1922, but the classes have had to be discontinued owing to the want of candidates coming forward. To meet these difficulties a scheme for the appointment of a Lady Assistant to the Inspector-General of Civil Hospitals was drawn up, also a scheme for a Nursing Association, but both are held in abeyance on account of want of funds. In Patna a Maternity and Child Welfare Supervisor was appointed in 1922 as an experimental measure, and visited 550 lying-in cases, 1,371 babies, and 2,220 houses and did excellent work in training *dais*. The Patna municipality, however, have not assisted this scheme financially in any way.

One of the most interesting items in the report is on the use of electrolytic chlorine—"E.C."—in the province. The Local Government—as the result of some years of trial of the new antiseptic in both surgical and public health work,—have given a grant for the purchase of the E.C. plant in order to issue E.C. in large quantities. "This valuable disinfectant has now got beyond the regions of experiment and is now an established fact of great importance," writes Colonel Austen Smith.

In November 1921, a specially appointed committee framed suggestions for the improvement of the public health service in the province, and the scheme is at present under the consideration of Government, it will require a large increase in the supply of doctors of the sub-assistant surgeon class and the energetic co-operation of the district boards. In the meantime, however several district boards are gradually, and as far as they can, introducing the scheme. The district board of Purnea is singled out as being very active in this matter, also Dr Livesey, Civil Surgeon of Darbhanga. In general, the scheme is to place the countryside within a radius of five or ten miles of his central dispensary under the sub-assistant surgeon in charge with regard to public health work and epidemic disease, his duties being to travel over such area, to immediately attend in any village where an outbreak of epidemic disease occurs, and not to remain glued to his dispensary. This scheme represents the first beginnings of what may ultimately prove the solution of the old controversy concerning any difficulty of co-ordinating medical relief and public health work. In any given province in India there seem to be two alternatives, either the work of medical relief and that of public health may be undertaken by two entirely different and water-tight organisations, the method hitherto adopted or some attempt may be made to combine both. The first method is wasteful, and means overlapping of work and friction, the second necessitates a large increase in cadre. But the Bihar scheme of making the doctor in charge of each rural responsible for the public health of a given area around his dispensary seems one of the best solutions of the difficulty.

The committee of the provincial branch of the Red Cross Society having decided at a meeting on the 26th April, 1922, to extend their work among the civil hospitals, a grant of Rs 10,000 was made to the I.G.C.H. and has been invaluable in the provision of extra and special diets and in securing the comfort of patients.

Turning to medical education, Colonel Austen Smith dwells upon the need for trained sub-assistant surgeons as the greatest medical problem in the province, especially in view of the very large demand for them which will arise under the working of the provincial public health scheme. The present supply comes from the Calcutta Medical College but when the Patna Medical College starts work and absorbs the existing Temple Medical School at Patna the supply will be increased, also the Orissa Medical School at Cuttack is training men. But men will be wanted for Government service, for district board service and for work as medical officers of companies and industries and it may be necessary to open up new medical schools: the two most important centres for such schools being Muzaffarpur and Gaya.

The Legislative Council having been insistent in the matter of the establishment of Kaviraj and Unani hospitals in the province, 3 such hospitals were started by Government in Puri district, 1 at Samastipur, and a Tibbi dispensary at Patna. But the supply of trained physicians in these systems is very scanty, and Dr P. N. Das, Civil Surgeon of Puri, on inspecting one of these institutions was far from enthusiastic regarding its value.

In summing up his most interesting report Colonel Austen Smith writes of his approaching retirement with regret and comments on the loyalty of his staff and of all officers in the department.

We tender our hearty congratulations to Colonel Austen Smith on this splendid record of his achievements in Bihar and Orissa. Colonel Austen Smith has made full use of his expert knowledge, enthusiasm and optimism for the betterment of the province, his report forms an excellent antidote to the pessimistic views which are held by some as to the future of medical institutions in India. It will be difficult for medical men of other countries to realise that this report deals only with the administration of medical relief, since

the importance of public health is emphasised in nearly every paragraph. It would be interesting to hear Colonel Austen Smith's views on the relationship which ought to exist between medical relief and public health in the rural areas of India. Obviously this must be close and intimate, medical relief is not so much an object to be attained as a means to an end, but the ultimate goal which is the improvement of the health of the people cannot be achieved unless the trail is blazed by medical relief and by the dissemination of a sound knowledge of disease causation and prevention.

We trust that Colonel Austen Smith may find leisure in his well earned retirement to keep up his interest in affairs in India and to make further contributions to our knowledge of the aims and methods of medical administration. Every one who has been associated with him feels a deep sense of personal regret at his retirement.

#### REPORT OF THE HEALTH OFFICER OF CALCUTTA FOR 1922 BY DR H. M. CRAKE, M.D. DPH. CALCUTTA CORPORATION PRESS, 1924

DR CRAKE'S report is one of the best models of public health reports that we have had the pleasure of reading. It is both ably written and profusely and well illustrated, the graphs and charts lending emphasis to the text. The public health of 'the second city of the Empire' is not without interest, that its care is in able hands the report under review shews.

The year 1922 was remarkable for an exceptionally dry spell during the earlier part of the year followed by almost torrential rains during the monsoon. The total rainfall for the year was 83.10 inches and the floods caused such considerable destruction of *bustees*—especially in Kidderpore—that a special grant of Rs. 5,000 was made at the instance of the ward commissioner for repairs. Hence the year may be classified as abnormal in its climatic respects.

As calculated on the figures for the 1921 census the death rate was 29.1 per mille a figure still higher than in the years prior to the big influenza epidemic of 1918-1919 but a clear indication that the aftermath of that dreadful visitation is disappearing. As usual, Ward 24—Kidderpore—headed the mortality rates at 53.7 per mille and this ward close to the docks, is the site of importation of most of the epidemic diseases of the city, of dengue, influenza and other evils. Ward 20—Beniapooker—came next, with a rate of 44.1 per mille and here respiratory diseases headed the mortality. Taking the question of sex ratios the death rates for the city were 24.1 per mille for males and 39.5 per mille for females whilst with regard to races, Mahomedans showed the heaviest mortality at 32.7 per mille. In March cholera, small-pox and influenza raised the rate to 36.4 per mille, the highest figure for the year, and this high mortality continued into April, probably in association with the unusually dry weather, and shewing a curve quite unlike that for other years.

Infant mortality for the city was 28.7 per mille of live births, a figure lower than that for the preceding four years, and the more satisfactory in that it is not due to an increase in the number of births reported, but to a decrease in the number of infantile deaths reported (the latter figure being probably more accurate than the former as an examination of all Indian public health reports shews). 36 per cent. of the infant mortality occurred during the first week of life and the chief causes attributed are congenital debility, premature births, and tetanus neonatorum.

The birth rate was 19.1 per mille of the total population. As Dr Crake notes this is no index to the fertility of Indian women, since, as is well recognised, in the large Indian cities males far exceed females in the population, and further, many Indian women go to their homes in the mofussil for confinement. The seasonal variation in the birth rate shews a minimum of 15.1 per mille of the population in June, and a high

peak of 25.8 per mille in November. Dr Crake states that this curious peak in the curve is difficult to explain, but surely the marriage season among the Hindus in the early spring explains it, the relative birth rate for Hindus being 58 per cent. of the total births, and for Mahomedans who number far fewer in Calcutta, being 6.7 per cent., 7.4 per cent. of the births were still-births.

Turning to the principal causes of mortality the cholera epidemic of 1922 was a comparatively mild one. Here the disease is very clearly water-borne and its heaviest incidence occurs in the riparian wards of the city, especially along the banks of Tolly's Nullah, Hindus—with their customs of bathing in and drinking such water—being especially affected. No less than 83 per cent. of the cholera cases occur among Hindus—a figure which is far in excess of their proportional population in the city. There was a mild and comparatively localised outbreak of small-pox during the year, which caused a total mortality of 0.49 per mille, and was at its height in March. Ward 14 was especially affected, but the intensive vaccination campaign carried out in connection with the severe outbreak of 1920, which caused nearly 3,000 deaths, probably helped to limit the outbreak. A study of the small-pox mortality for the last twenty years in Calcutta shews high peaks in 1906, 1909, 1915, and 1920, and the intervals between these epidemic years appear to be quite arbitrary.

There was a small and important localised outbreak of plague in March-April, with 144 deaths, whilst the total deaths attributed to malaria numbered 1,214, or 1.3 per mille. Here there is a curious difference in geographical incidence, Wards 20, Kidderpore, and 14, Taltollah, shewing a very heavy incidence as compared with the rest of the city. As shewn by Napier in his study of indigenous kala-azar in Calcutta city these are the two wards where the incidence of indigenous kala-azar is particularly high, and possibly much of this so-called "malaria" is in reality kala-azar.

Turning to "fevers" in general, the mortality from tuberculosis in Calcutta at once arrests the attention. The total mortality from this disease was 2,216 deaths or 2.4 per mille of the population. This is the highest figure recorded since 1907, in fact tuberculosis in Indian cities—as well emphasised by Powell in his report for the Bombay police force—is a special and important problem. In the Indian phthisis shews many features different from those seen in the European in Europe, the first symptom is often, not cough, but fever. The first physical signs are often at the hilum and not at the apex of the lungs, low fever in Indians is often due to incipient tuberculosis, hæmoptysis is relatively uncommon, in adult Indians acute tubercular broncho-pneumonia is very frequent, although in Europe it mostly occurs in children, whilst in India tuberculosis of bovine origin can practically be excluded.

Hence the problem of tuberculosis in Indian cities becomes one, the solution of which might throw much light on the ætiology of the disease. In Calcutta Mahomedans are especially susceptible, their death rate from tuberculosis being 3.2 per mille as against 2.2 per mille for Hindus, and above all other classes are Mahomedan women susceptible. In brief, promiscuous spitting and the seclusion of Indian women in the *purdah* system are important factors, yet there are other factors since the disease is quite common in Indian Christian females (as the superintendents of the Indian Zenana Mission Hospitals well know). Sex incidence shews a marked difference, between the ages of 15 and 20 years, for every male that dies of tuberculosis, six females die. Here premature marriage, the *purdah* and the strain of repeated child-bearing in early years take their toll. The "white plague" indeed constitutes one of the most serious of problems in Calcutta, and the difficulties are added to by the poor type of houses, the extremely congested buildings, the absence in poorer quarters of the town of fresh air and light. The poorer Indian woman in

Calcutta lives in a hovel, she cooks the family meals in what is practically a dungeon.

Respiratory diseases caused a lessened death rate than in 1921, the total number of deaths from these causes falling by nearly 2,000 as compared with the previous four years. The death rate from these causes is, however, still above the normal for the pre-influenza years and there was considerable influenza prevalence in March and the Spring months. Kala-azar is officially reported to be responsible for only 287 deaths a mortality of 0.31 per mille, and September shewed by far the greatest number of deaths from this disease. Here there must be included many deaths of kala-azar patients who had come into Calcutta city from outside for treatment.

Section III of the report deals with the work of the department in general. The insanitary buildings' committee continued its useful work. Special and successful efforts were made to improve the conditions of the bakeries in the city and the food inspection department under Dr S N Ghose, carried on its useful and important duties. Special mention is made of the work of the lady health visitors and midwives, and here very marked results are recorded. More than one-fifth of the babies born in Calcutta during the year were delivered by the Corporation midwives, and there were only 5 maternal deaths in these 3,917 deliveries, a result which speaks volumes for this most efficient service especially if it be noted that the Indian woman as a rule is delivered under the most appallingly insanitary conditions. In addition 112 difficult and complicated cases were removed to hospitals. Here is something more than a beginning of a reform of Indian midwifery conditions, a state of affairs where the skilled aid available is commencing to become adequate for the enormous problem presented. Of 3,510 babies on the infant welfare clinic rosters, only 64 died during the year.

The Corporation laboratory, under Dr T K Ghose examined 11,727 specimens during the year, and Major A D Stewart I.M.S., Director of the Public Health Laboratories, Bengal, carried out an investigation into the opalescence of the filtered water supplies from the Pulta waterworks in August.

Despite its high civic and civilised position, Calcutta city still suffers from all the disadvantages of the East. A few examples from this report will instance this. The residents at "a respectable hotel" in Calcutta complained of the character of their filtered water supply, investigation revealed the facts that of their two big masonry tanks for filtered water on the ground floor one was covered with loose wooden planks and the other was entirely uncovered. The tanks on the roof were in a "deplorable" condition, their covers missing, iron wires stretching across them which looked as if the hotel servants were using them for drying clothes on, and appearances suggesting that the hotel servants not only washed their personal apparel in these tanks of filtered water, but possibly also used them for bathing as well.

Suspensions of the quality of the ice-cream (*kulphi-baruphi*), so universally sold all over the city during the hot weather, having been aroused, 11 samples were collected for analysis during the night of the 23rd/24th May from different quarters of the city. The results of all the analyses suggested, "that the milk in each of the above samples was not less than 12 or 15 hours old, and that it contained not less than 1,000,000 fecal organisms per cc." In other words the ice-cream supply of Calcutta streets practically amounts to stale milk diluted with sewage effluent and frozen, and Dr Crake pleads for absolute suppression of the sale of this "delicacy."

Routine analysis of the water supply from the filter beds at the Pulta waterworks suddenly shewed in September one day an indication of gross pollution of one filter bed, as shewn by the colonies on MacConkey culture medium. Enquiries elicited the fact that a cow had accidentally wandered into the enclosure

around the filter bed, had fallen into the filter bed, had died there, and "partly owing to ignorance and partly owing to neglect, the said filter bed was not shut off or scraped for two days after the incident", so that 'essence of cow' escaped into the general Calcutta filter water supply. Luckily this supply is usually of exceptional purity, and comes from many filter beds, and the presence of the dead cow was insufficient to appreciably alter its quality. This incident led to vigorous disciplinary measures, and we take it that the next stray cow that visits the environment will not be allowed to reach the filter bed.

Such incidents are, of course, the commonplace in India. They are part and parcel of the events that render life in India both laborious and yet exhilarating for the public health official in this country.

The Corporation dispensaries continued their valuable work during the year, that at Kidderpore dealing with an average of 183 patients a day, and that at Kalighat performing 431 surgical operations during the year. The Vaccine Depot distributed 64,341 tubes of lymph during the year, only ripe lymph thoroughly cured in glycerine was used and the success rates reported from different municipal areas was from 98.2 to 99.8 per cent. The Ambulance service, under Capt Westbrook of the Fire Brigade, attended to 167 calls. The report finally closes with several appendices, amongst others an interesting one by Dr T K Ghose, on the different brands of ghee used in India and their sources of supply and manufacture.

The illustrative diagrams in Dr Crake's report are of especial interest and value. As compared with many of the smaller cities of India, Calcutta is a model of sanitation and cleanliness, yet the need for unceasing vigilance and for improvement in many directions cannot be gainsaid. If we may add a word of comment on this—and similar—reports, it would be to the effect that a brief resume of the report, written for the benefit of the general public as a short introduction, would probably be very much appreciated by many Calcutta residents as a document of popular local interest and importance.

## Correspondence.

### WHY ARE WE ONE-HANDED?

To the Editor, THE INDIAN MEDICAL GAZETTE

SIR,—It is not with the idea of offering a subject for discussion during the slack season of the hot weather that I write, but with a view to eliciting information.

For some reason after æons of bi-symmetrical evolution among the lower animals, man has become not only one-handed, but also one-sided. Thus some 80 per cent of persons utilise their right hand to the exclusion of their left, perhaps some 15 per cent are left-handed either in one or other manual function, some 5 per cent perhaps are ambidextrous. Yet nowhere have I heard of or seen a one-sided animal, they are all beautifully symmetrical, and it would appear that we must lose much of our physical and mental efficiency by employing only one-half of our bodies to their full extent. Moreover, the trend of modern civilisation seems to be towards increasing our one-sidedness.

It is very noticeable how a baby, lying on its back, kicks its arms and legs equally to left and right, and, as it grows, tends to use both sides equally and may take its spoon into its left hand or grasp its toys equally with both hands. On the child going to school, however he is taught to be right-handed.

It would seem as if education is not the sole cause for this one-sidedness, as we find the same condition in uneducated races, and, as far as I know, in un-



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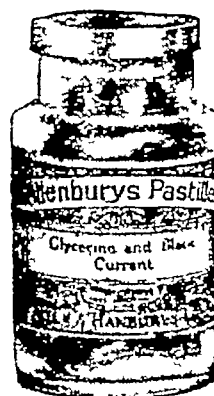
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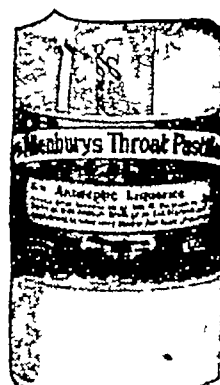
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civilised man. The obvious result is that man becomes unqually developed on the two sides of the body, and the thought has struck me that perhaps a centre for bi symmetrical development exists, which—through years of neglect—has ceased to function efficiently, and that this has perhaps more to do with the matter than inherited influences or education. The measurements of one's arms and legs shew a considerable difference, the left being smaller than the right in right-handed individuals.

Is it not a logical conclusion that the blood vessels supplying these limbs are likewise probably somewhat smaller on the less developed side? And to carry the inference still further, that the nerves likewise vary, that their conductivity varies, and, as the muscles are controlled by the motor areas, that these even are inferior in development to those on the right side of the brain. This might lead one to suppose that the co ordination between the two sides of the brain is not perfect. The fact that aphasia is generally due to lesions on the left side of the brain appears to bear out the idea of imperfect development.

It all this is correct, it opens up a wide field of conjecture as to the powers that a perfectly developed and co ordinated brain would have, both in reasoning power and in movements in which both sides of the body were called upon to act suddenly and accurately, as in such events as a motor collision, etc.

I would like to invite opinions on this subject from your readers.

Yours, etc,  
L. V. JAENSCH, M.D.,  
Civil Surgeon, Garhwal

PAURI GARHWAL, U P  
24th May, 1924

[It is well known of course, that ambidextrousness can be readily cultivated. Of two most interesting cases of which we know personally, one is an officer who lost his right arm at the shoulder joint during the war, and to-day plays a very good round of golf with the unaided left arm, another that of a Government servant who lost his right arm at the shoulder joint in a railway accident and still plays a good game of tennis, when serving he holds the racquet and one ball in his left hand, the second ball for service resting ready to be reached in his left-hand trouser pocket. A classical example of ambidextrousness is that of the celebrated painter, Landseer who could paint almost equally well with either hand, and sometimes with both simultaneously.—EDITOR, *Indian Medical Gazette*]

### AN EXTREME CASE OF MORPHIA TOLERANCE

To the Editor, THE INDIAN MEDICAL GAZETTE

SIR,—A male patient, who had taken to alcoholic excess during his youth, suddenly gave it up at the entreaty of his guardians. As a result he subsequently developed paresis of the left side. A doctor subsequently gave him an injection of morphia, with the result that—whether as the result of cause or coincidence—he commenced to walk again on the fifth day after the injection.

The patient was now—very mistakenly—placed under treatment with injections of morphia, with the result that a year-and-a-half later he commenced to inject himself. He took no precautions with regard to dosage, and was finally in a condition where he was able to take 40 grains hypodermically or 80 grains by the mouth. I could hardly have believed such figures, had I not myself given him an injection of 20 grains hypodermically and seen that it was followed by no ill effects.

He then gradually reduced the dosage by 10 grains at a time orally. One day he was three hours late in taking his dose, and a mild attack of what was apparently apoplexy followed. He is now anxious to give up the habit altogether if any medical man can advise as to the course of treatment to be pursued. The case

appears to be a unique one with regard to the dosage tolerated.

Yours, etc,  
HARI CHARAN GUPTA

MUKTAGACHA,  
16th May, 1924

### THE USE OF THE SETON IN KALA-AZAR

To the Editor, THE INDIAN MEDICAL GAZETTE

SIR—Antimony being the only drug which we recognise to-day as being of value in kala-azar, when resistant cases are encountered we resort to intramuscular injections of "T.C.C.O." and the like, in order to try to stimulate leucocytosis. In former days, the use of the *gool* or seton in order to produce leucocytosis, was well known.

Recently I was called in to see a patient with a nasty ulcer of the abdominal wall, situated over the site of an enlarged spleen. There was a large slough, some four inches in diameter, involving two layers of abdominal muscles, and hanging by a shred. After treatment with antiseptic dressings, the condition improved.

The patient gave a history of his village being infected with kala-azar. As it is very much out of the way, qualified medical aid is far to seek. A country *vaid* came to the village and commenced to treat the cases by cauterisation. His practice is to cauterise the abdomen in five points over the area of the enlarged spleen. A severe local inflammation results, but, as this heals up, the patient appears to be cured of his original complaint. As far as I could ascertain from local enquiries, every case which he had treated was cured of kala-azar. The village inhabitants attributed the condition of the case mentioned to his neglect of the ulcer produced.

These cases shewed a similar improvement to those treated with antimony injections. One does not know how antimony acts in kala-azar, whether it directly kills the parasites, or renders the body resistant to them. The method of treatment by cauterisation required about a month before the patient could be considered cured.

Yours, etc,  
HARI CHARAN GUPTA

MUKTAGACHA, MYMENSINGH  
19th May, 1924

[Any measure which will cause polymorphonuclear leucocytosis in kala-azar is to be welcomed. The difficulty is that the methods which usually succeed in doing so in normal health, usually fail in kala-azar cases. We have ourselves tried the seton without success in a few cases which threatened to prove resistant to antimony. Cauterisation over the site of an enlarged spleen is an almost universal panacea in many Eastern countries, the Swahelis in Aden, for example, often shew most intricate patterns of cauterisation with red hot irons over the site of the enlarged spleen in cases of malarial cachexia.—EDITOR, *Indian Medical Gazette*]

## Service Notes.

### APPOINTMENTS AND TRANSFERS

Lieutenant-Colonel C. B. McConaghy, I.M.S. Agency Surgeon, Bhopal is appointed to officiate as Administrative Medical Officer in Central India and Residency Surgeon, Indore, in addition to his own duties, with effect from the 2nd May 1924, until further orders.

Lieutenant-Colonel C. R. Bakhle, M.R.C.S., L.R.C.P., D.T.M. & H., I.M.S., Presidency Surgeon, 2nd District, Bombay, is appointed to be Inspector-General of Civil Hospitals, Punjab, with effect from the date on which he assumes charge of his duties.

The Viceroy and Governor-General has been pleased to make the following appointment on His Excellency's personal staff, with effect from the 29th April 1924—

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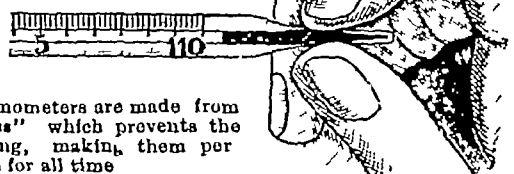
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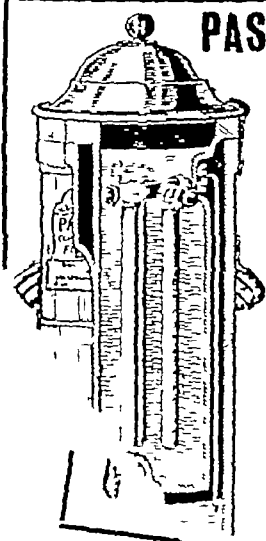
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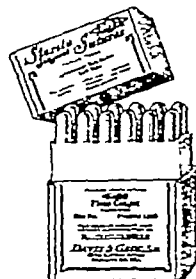
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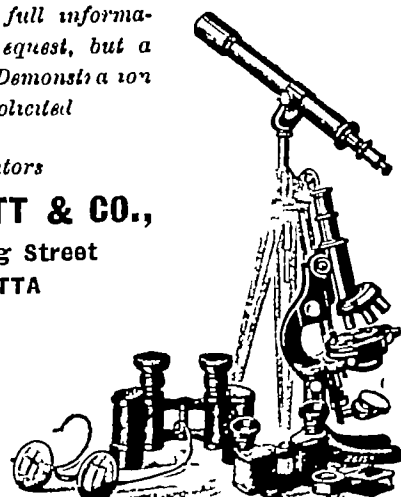
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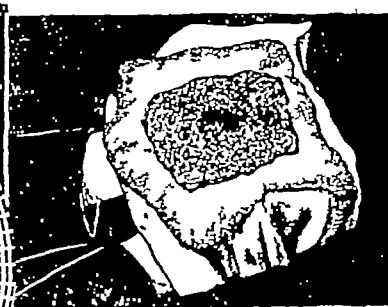
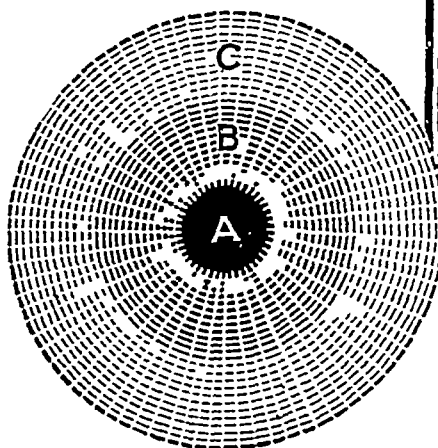
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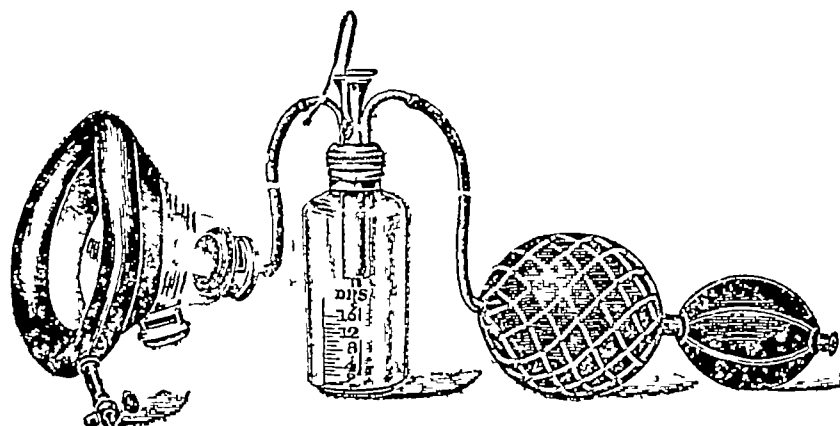
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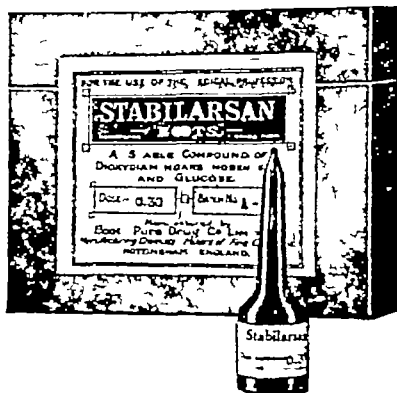
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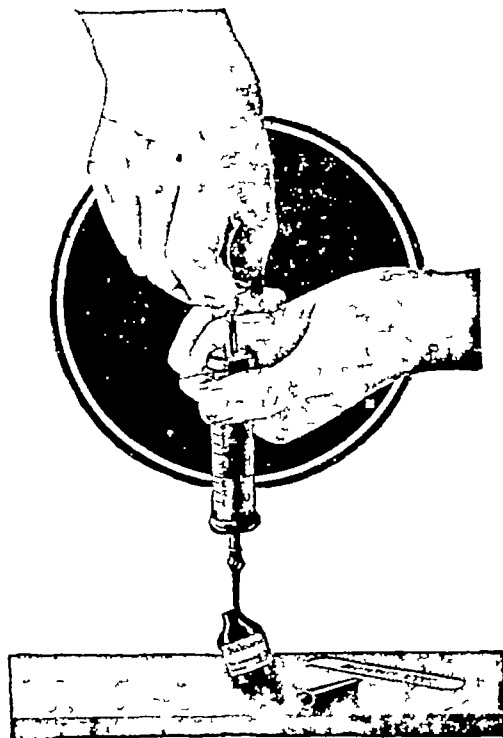


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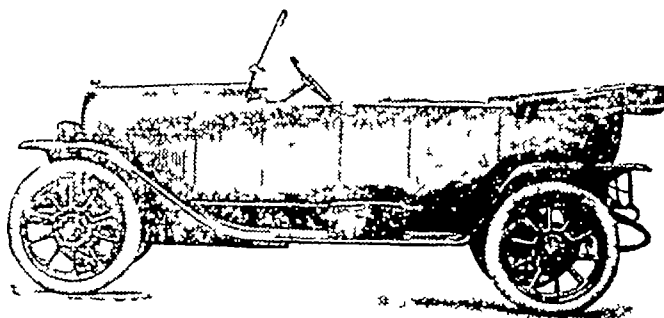
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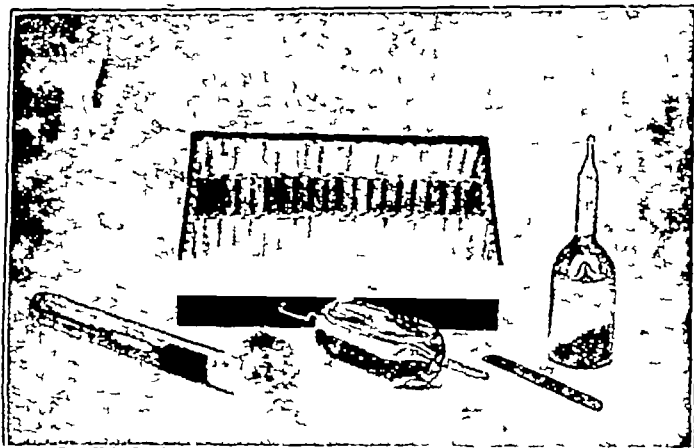


Fig. 1

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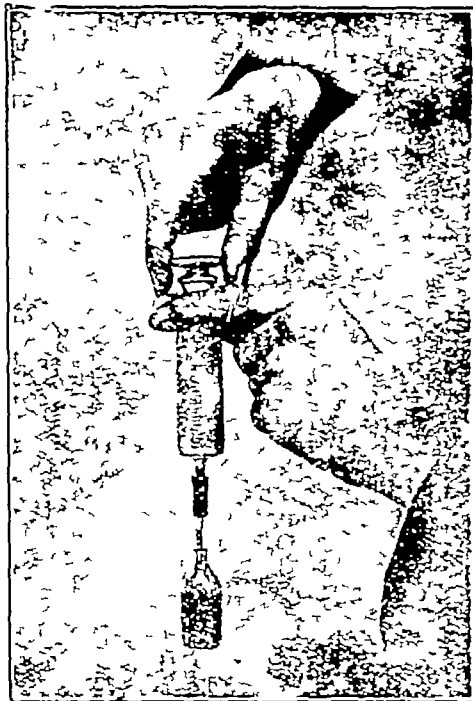
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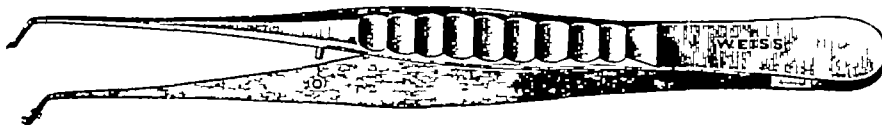
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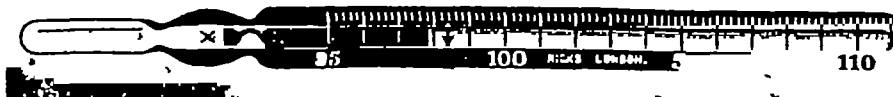
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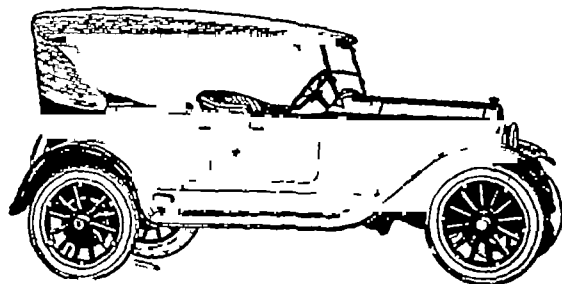
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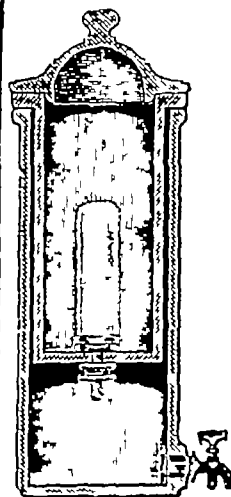
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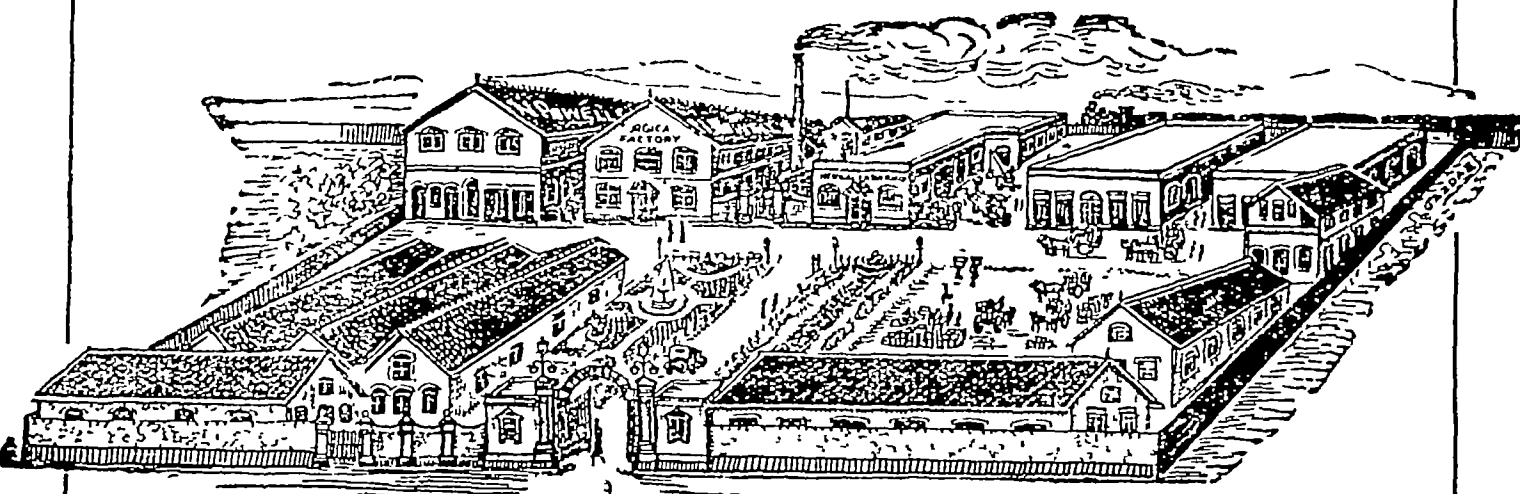
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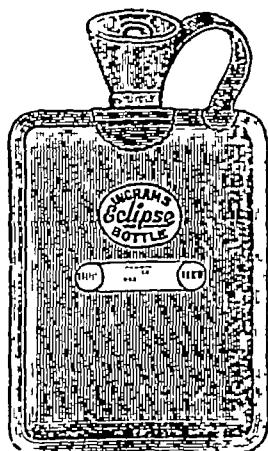


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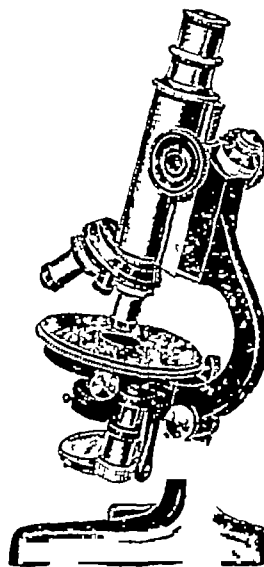
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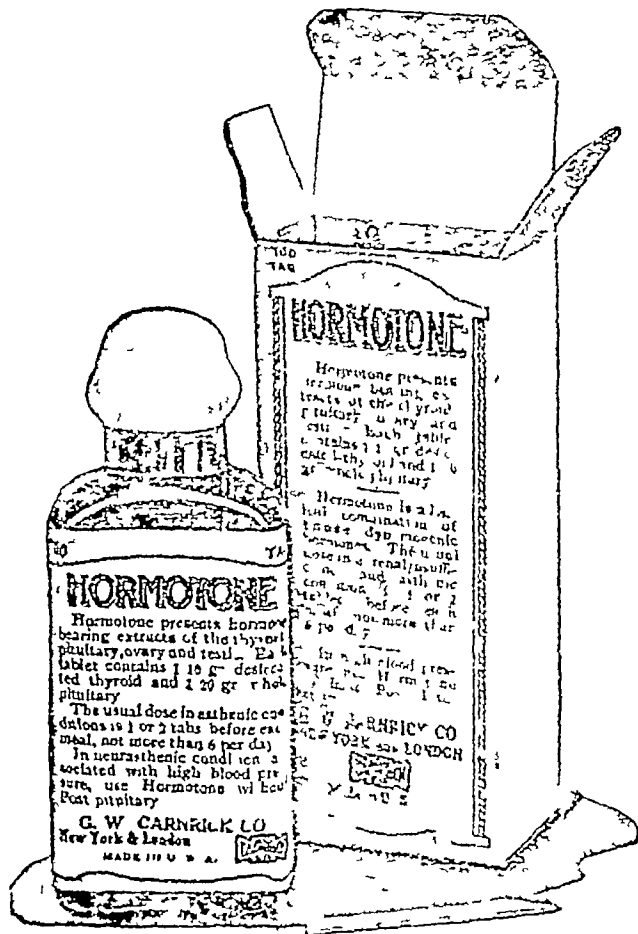
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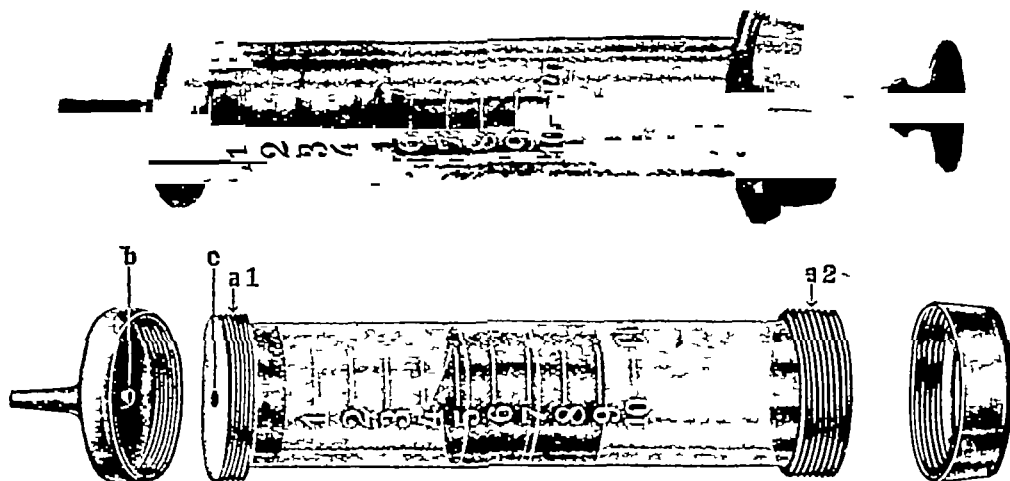
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### VENEREAL DISEASE PROBLEMS AMONG INDIAN WOMEN \*

By C. A. GOURLAY, D.S.O.,

LIEUT.-COLONEL, I.M.S.

#### INTRODUCTION

THE Voluntary Venereal Hospital at Alipore is, I believe, the only hospital of its kind in India. It owes its origin to the activity of those of our predecessors who endeavoured to control the spread of venereal disease by law. In 1869, 54 years ago, a Contagious Diseases' Act was passed. This was commonly known as Act XIV or *Chanda Am*. Under this Act, medical officers were appointed and inspection centres created. The medical officers, attended by representatives of the police, inspected public women either at their own homes or at these centres, and examined them for venereal infection. Indian public women who were found to be infected were compulsorily removed to the *Chanda Am* Hospital for treatment. European women were sent to a Lock Hospital at Sealdah and anyone conducting the profession of prostitution while infected was prosecuted.

In those days this hospital consisted of one pucca building with hutting for about 500 patients and was under the control of the Commissioner of Police.

In 1883 the Contagious Diseases' Act was repealed and these hospitals for women were made over to the Medical Department for the voluntary treatment of venereal disease. The hospital at Sealdah does not appear to have flourished to the same extent as that at Alipore, as I understand it was abolished about 1902, owing to lack of patients. The Voluntary Venereal Hospital at Alipore has been carried on ever since 1883, and of recent years the beds have been in great demand. It is known to this day among Irish as the *Chanda Am* Hospital. The records show that the work has increased under the voluntary system.

As probably few of you know the hospital I will give you a brief description of it at the present day. It is situated in Bhowanipur Road between the Military Cemetery and Tolly's Nullah and has a good compound. It now consists of an administrative block and two large ward buildings with the necessary servants' quarters and out-houses. In the administrative block we have an office, a combined dispensing room and laboratory, two small wards with four beds in each, an examination room, and a contractor's godown.

One of the ward buildings has three wards with a capacity of 40 beds, and the other has one large ward with 30 beds.

The clientele still consists chiefly of public women, and as the hospital is well known to that community, not only in Calcutta, but throughout Bengal, there is no difficulty in keeping all the beds occupied.

From time to time we deal with women of better class and we are anxious to extend this side of the work. The two small wards in the administrative block enable us to deal with such cases without constant intermingling with the others.

The hospital expenditure is entirely borne by the Government of Bengal. The personnel consists of the Superintendent who visits twice weekly. There are two honorary workers who also visit twice weekly, viz., Dr K. S. Roy and Dr (Miss) S. Ghosh. The resident staff consists of one Sub-Assistant Surgeon, Dr Situl Chandra Dutta, one compounder and one clerk. The nursing is done by four *dhis*. These have been recruited from among the patients, and I have at present four exceedingly good workers whose practical knowledge of the lesions met with is very considerable. Should we evolve some day a system of centres for the treatment of venereal disease among women throughout the city, as I hope we may, there ought to be no difficulty in finding the necessary attendants through this hospital.

The hospital provides each patient with bedding, clothing, feeding plates and diet during her stay. The food is good and provided at an average cost of about 5½ to 6 annas per head per day. We have our own cowshed so that our milk supply is under our own supervision.

As most of the patients are able to walk about, they are examined and treated in the examination room in the administrative block and no detailed bed to bed examination is required.

Some two years ago we acquired, through the sympathy of H. E. Lord Ronaldshay, a good microscope with an oil immersion lens and this is regularly in use for diagnosing gonorrhoea and for testing smears to satisfy ourselves of the results of treatment. Recently we have introduced apparatus for carrying out the Sachs-Georgi test for syphilis and find it practicable to test all cases of doubtful diagnosis, as well as to get some idea of the state of the blood on discharge from hospital. At the same time, by special arrangement with the Serological Department, we have a great number of Wassermann tests carried out, although we have no facilities for doing this test ourselves.

The total cost of the hospital is about Rs 30,000 per annum which works out at Rs 385 per bed per annum or a little over

\* Being a paper read at a meeting of the Medical Section of the Asiatic Society of Bengal on the 10th of October 1923.

Re 1 per bed per day,—a very low figure as those interested in hospital administration will appreciate

Having thus introduced you to the hospital, I wish to give you some idea of the work done in it. I purposely avoid giving you many statistics, but, to enable you to realise the type of case dealt with, and roughly to give you an idea of proportion, I had a census taken of the cases in hospital on a day chosen at random during the preparation of this paper. There were, on that occasion, in the hospital 5 cases of soft sore, 8 cases of bubo, 18 cases of gonorrhœa, 27 cases of syphilis and 17 cases of mixed infection, i.e., gonorrhœa combined with soft sore or syphilis, or soft sore combined with syphilis, or all three together.

I propose to give you short descriptions of our experience with soft sores and buboes and more elaborate ones of our experience with gonorrhœa and syphilis.

#### SOFT SORES

We see a great many soft sores, and many cases in which the lesion on the generative organs appears to be a soft sore afterwards prove to have syphilis as well. These sores are generally found on the labia majora or minora, on the clitoris or on the vaginal wall not far from the entrance. They can almost always be detected by separating the parts with the fingers. I do not recollect having seen one so far inside as to require a speculum for its demonstration.

They are usually large on admission—by which I mean about 1 in. or  $1\frac{1}{2}$  in. in diameter. They often have an irregular undermined edge with inflamed tissue beyond this margin, and the base is of a yellowish colour secreting a profuse discharge. These are generally accepted as being due to a specific organism. Ducrey's bacillus is believed by most authorities to be the casual agent.

A certain number of these cases are accompanied by inflammatory swelling of the groin glands at a time when the sore is the urgent indication for treatment, but many of them, and often quite extensive ones, are not accompanied by buboes, although these may develop later when the sore has healed.

In our returns for 1922 we shewed 135 cases of soft sore. Of these 18 were complicated by gonorrhœa and 98 were accompanied by syphilis. Obviously we are in the habit of diagnosing mixed infections (of chancroid and syphilis) extensively.

If you refer to McDonagh's work, you will find that he considers that a soft sore very rarely becomes a chancre. If a chancre develops on what was diagnosed as a soft sore, then the initial diagnosis was wrong. He adds that the more experienced the physician, the more rarely is double infection diagnosed.

In face of this view I wonder if we are correct in our diagnosis of these mixed cases. When dealing with chancres—i.e., syphilitic sores, McDonagh describes a variety which he calls ulcerative chancre, stating that this may be a sequel of any chancre which has become secondarily infected with ordinary pyogenic organisms. Is it possible that many of the cases which we have looked upon as chancroid plus syphilis are really syphilis plus sepsis? McDonagh seems to have a clear idea in his own mind of the distinction between the ulcers found in these two combinations, but I confess I am not very clear about it myself, for the characters of a soft sore seem to me akin to those of any ulcer caused by pyogenic organisms. Of course one might hope to get something regarding the exact date of onset of a sore if the histories were reliable, but they are not, and one has to depend on the evidence of the senses.

Our bacteriological researches have not entered this field of enquiry, and my working rule is never to trust to an alleged soft sore being pure,—always look for evidence of syphilis elsewhere and have the blood tested.

In any case, such sores respond fairly well to treatment, the essential features of which I believe are rest and cleanliness coupled with a regular life and good food. We commence treatment with hip baths and follow this up with lotions, ointments and dusting powders all of which contain mercury. I omit for the present further details of the treatment of the syphilitic element in these cases. They generally take 3 to 4 weeks to heal.

#### BUBOES

A study of text book descriptions shows that the term bubo is used in a wide sense to embrace almost any enlargement of glands due to venereal disease. Even in addition to enlarged glands in the groin occurring in all three venereal diseases, the term is applied to an enlarged gland nearest to an extragenital chancre.

In syphilis the term "bullet bubo" is applied to the hard shotty type of gland of that disease, and the term "giant bubo" to the enlarged gland behind an extra-genital chancre.

In gonorrhœa, authorities do not lay much, if any stress on the condition of the inguinal glands, though Magian states that lymphadenitis is common and if neglected, goes on to suppuration. McDonagh says that 90 per cent of gonorrhœa cases have inflammation of the inguinal glands.

In our work, we reserve the term bubo for an acute inflammatory condition of the groin glands which may or may not go on to suppuration. It may be that in some cases this is due to gonorrhœa, but as a general rule it is due to soft or septic sore. It is noteworthy

that of the cases which come to us, the vast majority require something more than rest and fomentations, probably because they come late. Last year we dealt with 73 cases of buboes. Fifty-two of these were admitted with soft sores still unhealed. Eighteen of them had evidence of syphilis and a history of chancroid. In three the only other sign was gonorrhœa, but even here one feels that the bubo may have been due to a previous soft sore, the scar of which was not observed.

It is possible by rest and tincture of iodine and boric compresses to get absorption, but as a rule we find that some more drastic surgical procedure is necessary, as pus has formed. We have tried Harrison's method of aspirating and injecting tincture of iodine, but not with very satisfactory results. Out of 19 cases so treated 7 were successful and 12 ultimately required incision or even excision of the glands. McDonagh teaches that suppurating buboes require only small incisions and that excision of glands is an unnecessarily severe surgical procedure. This has not been our experience. While attempting to deal with buboes by mere incisions and scraping of an individual gland we find that later other glands of the group break down at intervals and that much time is often lost by treating the glands separately. It, therefore, the infection seems extensive, we go for excision of all the enlarged glands at once. Working on these lines I should say that about two-thirds of the cases come to excision and one-third are cured by incision.

The treatment takes 3 to 4 weeks.

#### GNORRHŒA

As I have mentioned we keep about 20 beds for this disease. As all our patients are in-patients they are under constant supervision, and all treatment and manipulations are carried out by more or less skilled labour.

The main points of the local anatomy which one has to keep in mind in gonorrhœa are the vulva, including the labia and Bartholin's glands buried in these, the vagina, cervix uteri with its canal some  $\frac{3}{4}$  in in length, the uterus and Fallopian tubes wrapped up in the broad ligament, and the ovaries, and the urethra with two para-urethral ducts and two Skene's ducts.

Theoretically, gonorrhœal infection introduced into the vagina may penetrate any of the ducts mentioned. It may spread over the vulva into Bartholin's glands, into the cervix, the uterus and the Fallopian tubes. From the uterus or Fallopian tubes it may invade the surrounding tissues. It may enter the para-urethral ducts, the urethra, Skene's ducts, or the bladder, ureters and kidneys. It may become generalised in the blood stream and settle in the joints or it may

be carried on fingers or towels to the conjunctival sac, and it may also penetrate the rectum.

Such is a fairly complete picture of what may happen, but for practical purposes one wants to get familiar with what usually happens and our experience may help to give you a general idea of this.

Acute gonorrhœa I must pass over, we seldom see a case. I understand it is the fairly common experience of such hospitals that the patients do not come in the acute stage.

The vast majority of the cases which we see are chronic gonorrhœas with cervicitis as the only gross complication. The patient comes complaining of profuse vaginal discharge which stains her clothing. The condition is painless. The necessary examination consists of inspection, which in these cases reveals absence of inflammation about the vulva. Thereafter a speculum is inserted, the vaginal wall may be somewhat red and congested, but no gross abnormality is seen other than the presence of one or two drachms of somewhat milky discharge which collects on the tip of the speculum and appears to come from the vaginal wall. On examination of the external os a plug of opaque mucus-pus is seen protruding from the cervical canal and the os may be somewhat eroded. With the speculum still in position, the left forefinger is drawn down the anterior vaginal wall to the urinary meatus. This ought to produce a bead of pus from the para-urethral ducts if infected, or from the meatus if the urethra or Skene's ducts are infected. In these cases no bead of pus is seen. If the speculum is removed, Bartholin's glands may be squeezed and here again a bead of pus should be seen at the mouth of the duct if infected. In these cases nothing is seen. By digital examination the fornices may now be examined and the tissues are found soft and pliable, in fact normal, while bimanual examination reveals a freely movable uterus and absence of pain from the pelvic area, indicating that there is no infection of the genital tract above the cervix uteri. In the majority of cases one has to deal with a vaginal discharge plus an inflammatory condition of the cervical canal. The vaginal discharge can be markedly reduced in 3 or 4 days, but the cervical canal requires treatment for 3 or 4 weeks.

As regards complications other than the cervicitis, the commonest are varying degrees of inflammation about the vulva and perineum. Excoriations of great extent, giving very tender surfaces of exposed dermis, and secondary infection of the inguinal glands can reduce the patient to a state of abject misery. Inflammatory cedema, with or without pustular eruptions of the labia majora, and infection of Bartholin's glands are

gummata I imagine that other tertiary lesions, not being recognised as syphilis by the public, find their way into the general hospitals, if they come for treatment at all.

The same applies to syphilis of the nervous system.

*Treatment*—The treatment of syphilis is another subject so extensive as to make few remarks seem very inadequate, but all I can do here is to give the history of treatment and the present practice in the Voluntary Venereal Hospital.

We may neglect all history prior to the introduction of organic arsenic as no longer of practical interest.

In 1917 the late Lieut-Colonel Sutherland visited the hospital and through his influence a gift of 100 doses of novarsenobillon was obtained from a Marwarī gentleman named Sunder Mull of Girdih. About the same time, the influence of the Royal Commission's report began to be felt. The Government of Bengal increased the annual allotment for medical and surgical equipment so as to allow of an expenditure of Rs 1,800 to Rs 2,000 on organic arsenic.

From 1917 to 1920 the treatment consisted of giving 3 doses of N A B, 0.45, 0.6, 0.9 gm at weekly intervals. This was accompanied on alternate days by intramuscular injections of a soluble mercury salt, viz., ammonio-mercuric chloride—gr  $\frac{1}{2}$  in 10 minims of water.

Not satisfied that the organic arsenic was sufficiently prolonged and dissatisfied with the frequent repetitions of mercurial injections and also having procured a grant for literature, we purchased Harrison's *Diagnosis and Treatment of Venereal Disease in General Practice*, and altered our scheme to that indicated on page 418 of this book, viz,—

Weekly injections as follows—0.45, 0.45, 0.6 gm, interval, 0.6, 0.6 gm, interval, 0.6, 0.6 gm, and on the mid-day of each week an intramuscular injection of mercurial cream representing 1 gr of mercury in each dose.

This scheme Harrison recommends for early primary cases in which the Wassermann test is still negative and he recommends further courses for more advanced cases. We have not been able to follow his ideal as the patients would neither wait so long nor return for further treatment.

Finding in Harrison a strong advocate of intramuscular as opposed to intravenous injection of 914 we adopted this plan in the winter of 1920-21. The arguments are, though somewhat painful it is tolerable, and the drug is more slowly absorbed and more slowly excreted, and these are taken to mean greater safety and greater therapeutic effect.

I was at Home in 1921 and found that although Harrison advocated intramuscular injections, he did not seem to have the majority of syphilologists with him in this, and on

my return I did not press it as I found it had been given up in my absence. It is obviously distressing to the patient, if not actually painful, and the intravenous method is simple enough. Therapeutically I don't think we appreciated any difference in effect in the two methods.

Under such treatment as used to date, the obvious symptoms cleared up rapidly but there were not infrequently cases of poisoning both with arsenic and with mercury. So much so that Assistant Surgeon Rash Mohan Bose was able, from practical experience, to write quite a useful article on arsenical poisoning during the treatment of syphilis which appeared in the *Indian Medical Gazette* of September 1920. Though interesting by way of experience, this was not satisfactory as we had more than one death.

Realising that Harrison's doses were based on experience of soldiers with an average weight of 10 stone, I had all the patients in our hospital weighed and discovered that we were working on an average weight of 6 stone.

I, therefore, modified the dosage but kept to the scheme with much better results, that is with no obvious loss of efficiency we got an almost complete disappearance of poisoning. We only saw a few cases of mild jaundice and one case of exfoliative dermatitis.

But we could not yet be satisfied, for this treatment meant 9 weeks' stay in hospital and our patients would not submit to this, so we still searched for some more suitable scheme, and in July 1922, we got Clarkson's *Venereal Clinic* which we found the following scheme recommended—

Four weekly injections of N A B with weekly intramuscular injections of mercury for 8 weeks. This is for early cases, and is to be repeated for more advanced cases.

This course we have found more practicable here. The patients stop for 4 weekly injections of N A B, during which they also have mercurial injection on alternate days and take away with them mercurial ointment for another month.

While working on these lines my attention was called to Stabilarisan, and I may say at once that this is the preparation which I prefer so far. It is 606 in glucose prepared in an ampoule for intravenous injection, and as the manufacturers are so careful to have only fresh supplies on the market that it is difficult to procure, I trust the ampoules thoroughly. It is simple to use, reliable and about the same price as other preparations. It appears to me to be quite as efficient as N A B, perhaps more so and much more easy to use, and we use it on the same scheme as Clarkson recommends. In either case we get no signs of poisoning.

With regard to the administration of mercury, as you know the alternatives are oral



(i.e., hydragric creta),unction (ung hydraigri), intramuscular injection of an insoluble preparation (mercurial cream) or of a soluble one (ammonio-mercuric chloride)

It is generally agreed that oral administration is the least reliable and should be used only where the circumstances of the patient preclude other methods. The injection of a solution is open to the objection that it means frequent attendance by the doctor. The injection of a suspension of mercury is widely used and is effective, but we have found that it is open to objection in that cases of poisoning occur. As at one fell swoop, you have given a week's supply, the poisoning may be severe.

I prefer unction for our purposes. We give it on alternate days. It suits our circumstances, where we can have a regular parade in which each patient does her own unction under supervision. At the moment that a patient shows signs of poisoning we can stop the treatment and arrest the progress of the poisoning. We used to see a good deal of poisoning when we were using intramuscular injections of cream, but now we arrest the drug on evidence of salivation and so avoid more serious symptoms.

Before leaving the subject, I would like to make quite sure that you appreciate our present position in the treatment of syphilis. Theoretically the system consists in using either NAB or Stabilarisan in 4 weekly injections. This takes a month. During this and the succeeding month, the patient has mercury. An interval of 2 months should then be allowed to elapse and then the Wassermann or Sachs-Georgi test should be made. If positive, the treatment should be repeated. If still positive, it should be repeated a third time. Thereafter, failures, according to Clarkson, should be treated simply with potassium iodide and mercury.

Practically, up to the present time we have been balked in carrying out the system by the refusal of our patients to stay more than one month. Hence in our practice they get four weekly doses of NAB or Stabilarisan with mercurial unction running concurrently, and we hope that they will accept the facilities for another month of mercurial unction. You will see that our latest chance for a Wassermann reaction comes at the end of one month's treatment. Such tests are of little value as a test of disinfection, so I purposely do not discuss the statistics. In the meantime, the symptoms all clear up, the patients look well and happy and are for the time being in good health. They go out for the most part, I fear, to return to the houses of ill-fame from which they have come. Some of our cases were pregnant and no interference with the condition was observed.

In these circumstances, you will appreciate that relapses or reinfections are frequent, and the following figures for 1922 will give you some idea of what happens.

Total admissions for syphilis	324
Cases unknown to us previously	196
Cases recognised as having been treated for syphilis previously in the institution	128

Nearly 40 per cent of our syphilitics were cases we had previously treated for syphilis.

This I think will emphasise in your minds the importance of not resting content with a single short course of organic arsenic if you can by any means persuade your patients to go through repeated courses with due attention to the Wassermann reaction.

In conclusion, it would be discourteous of me not to acknowledge the assistance of Sub-Assistant Surgeon Sital Chandra Dutt in the preparation of the clinical portion of this paper and of the clerk of the Voluntary Venereal Hospital in the historical portion.

#### A NOTE ON THE SEROLOGICAL DIAGNOSIS OF TYPHUS BY THE WEIL-FELIX REACTION

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The recent occurrence of an outbreak of typhus in Simla has afforded me an opportunity of testing the value of the Weil-Felix reaction in the diagnosis of this disease as it occurs among Indians and a full account of the outbreak and of the experimental investigations carried out in connection with it appeared in the *Indian Journal of Medical Research* for July 1922.\* The reaction as a diagnostic method in Indian cases has proved, however, in my experience of such great practical value that it may be of interest to place on record in the *Indian Medical Gazette* a summarised account of the outbreak and of the results of the Weil-Felix reaction.

#### ABSTRACT

The outbreak consisted of sixteen cases (8 males and 8 females) of which six ended fatally. The cases were limited to a single Mohamedan family of vegetable sellers, and with two exceptions all were blood-relations, a fact of some significance in a louse-borne disease.

The first three cases of the series were fatal and the disease was not recognised during life. When, however, further cases developed, enquiry shewed that some disease was

\* Major Phipson's abstract is published by kind permission of the Editor of the *Indian Journal of Medical Research*—Ed., I.M.G.

occurring among relatives of the three cases which had died, a fact which suggested an infectious origin. Bacteriological examinations for relapsing fever, malaria and enteric group diseases gave a negative result, and the blood of two recently recovered cases was then taken and tested for agglutination with *B. proteus* X 19 with a positive result, indicating that the disease from which they had just recovered was almost certainly typhus fever.

The clue to the nature of the disease having thus been afforded by the serological reactions of the two recovered cases, the remaining cases were placed under close observation and the diagnosis definitely established.

The origin of the outbreak was not known with certainty, but the virus was undoubtedly imported from outside Simla. The available evidence pointed to the infection having been introduced from the town of Suni, the capital of Bhajji State, some 26 miles by road from Simla. At the time when the infection must have been introduced, a limited outbreak of what was believed to be typhus was in progress in Bhajji State. This outbreak coincided in point of time with the season for gathering limes for which the Suni neighbourhood is well-known. During the lime season there is a brisk traffic between Suni and the Simla market, and there were some reasons for connecting the lime sellers who brought in the fruit to Simla, on the one hand with the Suni family who were stricken with the fever resembling typhus, and on the other hand with the first case of the Simla series, who was himself a vegetable seller by trade, the inference being that infected limes were brought to Simla by a healthy human intermediary.

The clinical features of the outbreak did not greatly differ from those recorded in the Indian outbreak described in the *Indian Medical Gazette* for June 1908 by Husband and MacWatters, and a clinical description of the comparatively few cases under detailed observation is therefore hardly necessary.

It may, however, be desirable to comment briefly on those clinical features which possess diagnostic importance.

(1) The *facies* of the patient is in many cases characteristic.

The flushed face with some conjunctival injection, the rapid expression coupled with slow cerebration, are very suggestive of alcoholism.

(2) The type of *fever* in the milder forms of typhus is hardly characteristic but it is possible to discern some points of similarity in the examples given in the charts. In all cases defervescence was by lysis lasting 2 or 3 days. In several of the cases there was a well-marked remission in temperature a few days before the beginning of the defervescent period.

(3) The *rash* in the Simla cases was made out in all the 6 cases which came under detailed observation. In only 2 cases was it in any degree obvious, and in most of the cases it was so scanty and indistinct that it would certainly be overlooked unless specially sought for. The earliest manifestation of the rash took the form of discrete macules about 2 to 4 mm in diameter, first of the same colour as the surrounding skin and almost invisible, except that by oblique illumination they are seen to be raised to a minute extent above the general skin-level. The macules as they develop acquire a pinkish tint, turning later to a purple or purple-brown hue, and finally disappear in about a week. The rash was most easily made out on the inner sides of the arms and bend of the elbow, where the skin is finer in texture and less pigmented. It was also seen on the back, chest, neck, and other parts of the body. Careful cleansing of the skin is an essential preliminary and the application of oil to the clean dry skin surface was found to assist materially in making the rash more clearly visible by increasing the transparency of the outer layers of the epidermis. No true petechial eruption was observed, and no "water-course" erythema as described by some writers could be made out.

(4) The pulse rate of all the cases, as will be seen from the charts, ranged very high, a diagnostic point emphasized by Husband and MacWatters.

(5) One negative feature is worthy of mention. None of the cases shewed jaundice nor even icteric tinging of the conjunctivæ, which is so common in relapsing fever.

(6) The convalescence was rapid and quite unlike the long and tedious convalescence after relapsing fever.

*The technique of the Weil-Felix reaction*—The technique of this reaction is quite simple. It consists of an agglutination reaction between the serum of a suspected case and a bacillus of the *proteus* group originally isolated from the urine of typhus cases, and named *B. proteus* X 19. Other strains of *B. proteus* have been similarly isolated and are said to possess a greater degree of agglutinability with typhus sera, but the X 19 strain used in this investigation was found to be quite satisfactory. The reaction is not, according to most authorities, truly specific, but the organism nevertheless retains its agglutinating properties unimpaired after years of sub-cultivation. It grows abundantly on ordinary agar and emulsifies readily.

Any method microscopic or macroscopic, may of course be employed in demonstrating the agglutination reaction. The method which I usually employ and employed in this investigation is the macroscopic method with Garrow's agglutinometer. The method lacks

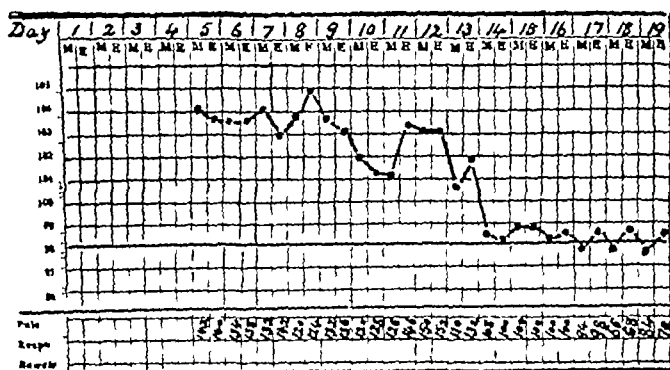
TABLE I  
*Statement showing results of the Weil Felix Reaction in the Simla Outbreak.*

Serial No	Name	Age	Sex	Relationship	Date of Onset	Issue of Case	Duration of Fever	Interval between onset of disease and examination of blood	Dilutions of Patient's serum								REMARKS
									1	1/2	1/4	1/8	1/16	1/32	1/64	1/128	
1	Salim	48	M	Uncle	10-11-22	D 30-11-22	? 15 days	10 days	++++	+++	++	+	+	+	+	+	These cases not seen during life Diagnosis presumptive The two original cases whose sera, after recovery, gave the clue to the nature of the disease Not seen during life
2	Muna	55	M	Father	11-12-22	D 26-12-22	? 15 days	62 days	+++	++	+	+	+	+	+	+	
3	Munta	20	F	Daughter	13-12-22	D 26-12-22	? 15 days	19 days	+++	++	+	+	+	+	+	+	
4	Dilbur Hussain	12	M	Son	29-12-22	Recovered		62 days	+++	++	+	+	+	+	+	+	
5	Mohd Ghaffur	14	M	Son	29-12-22	Recovered		12 days	++++	+++	++	+	+	+	+	+	Case complicated with broncho pneumonia *? Accidental destruction of agglutinins by error in technique Died before agglutinins could develop Not seen during life
6	Anuruddin	13	M	Son	1-1-23	D 16-1-23	21 days	25 days	++++	+++	++	+	+	+	+	+	
7	Fatma	22	F	Daughter	9-1-23	Recovered		39 days	++++	+++	++	+	+	+	+	+	
								47 days	++++	+++	++	+	+	+	+	+	
8	Abdul Majid	20	M	Son	14-1-23	D 21-1-23		56 days	++++	+++	++	+	+	+	+	+	This case was admitted to the local Dufferin Hospital and regarded as a case of enteric fever. The second specimen of blood (14th day) settled the diagnosis. She was a contact of the other cases
9	Salman	50	F	Mother	17-1-23	D 23-1-23	15 days	72 days	++++	+++	++	+	+	+	+	+	
10	Khursluda	16	F	Daughter	20-1-23	Recovered		4 days	++++	+++	++	+	+	+	+	+	
									+++	++	+	+	+	+	+	+	
11	Zohra	3	F	Gr daughter	24-1-23	Recovered	11 days	6 days	++++	+++	++	+	+	+	+	+	This case was admitted to the local Dufferin Hospital and regarded as a case of enteric fever. The second specimen of blood (14th day) settled the diagnosis. She was a contact of the other cases
12	Zobeda	6	F	Gr daughter	24-1-23	Recovered	9 days	16 days	++++	+++	++	+	+	+	+	+	
								30 days	++++	+++	++	+	+	+	+	+	
								38 days	++++	+++	++	+	+	+	+	+	
13	Ghaffran	18	F		27-1-23	Recovered	13 days	46 days	++++	+++	++	+	+	+	+	+	This case was admitted to the local Dufferin Hospital and regarded as a case of enteric fever. The second specimen of blood (14th day) settled the diagnosis. She was a contact of the other cases
								8 days	++++	+++	++	+	+	+	+	+	
								14 days	++++	+++	++	+	+	+	+	+	
								28 days	++++	+++	++	+	+	+	+	+	
14	Mohd Shafi	23	M	Son	30-1-23	Recovered	15 days	35 days	++++	+++	++	+	+	+	+	+	Diagnosed after recovery A contact of the other cases
								7 days	++++	+++	++	+	+	+	+	+	
								14 days	++++	+++	++	+	+	+	+	+	
								19 days	++++	+++	++	+	+	+	+	+	
15	Hamida	13	F	Gr Niece	6-2-23	Recovered	? 12 days	30 days	++++	+++	++	+	+	+	+	+	Diagnosed after recovery A contact of the other cases
16	Mohammed	45	M	Husband of No 7	16-2-23	Recovered	11 days	42 days	++++	+++	++	+	+	+	+	+	
								53 days	++++	+++	++	+	+	+	+	+	
								15 days	++++	+++	++	+	+	+	+	+	
								5 days	++++	+++	++	+	+	+	+	+	
								7 days	++++	+++	++	+	+	+	+	+	
								12 days	++++	+++	++	+	+	+	+	+	
								20 days	++++	+++	++	+	+	+	+	+	

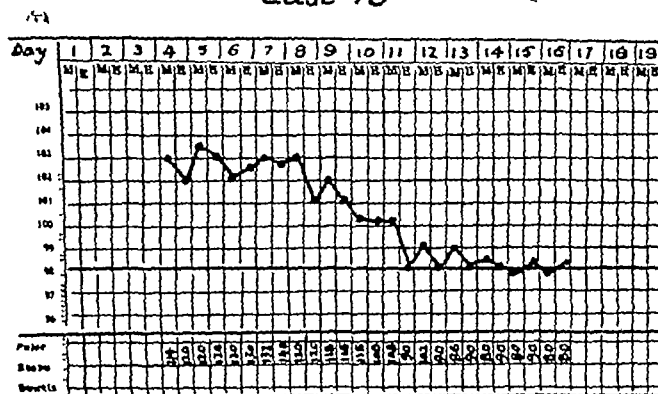
perhaps the scientific precision of Dreyer's technique, but it is very economical in time and material and quite accurate enough for diagnostic purposes. The results of the agglutination experiments are recorded in Table I. It is necessary to state that in this table no distinction is drawn between complete and incomplete reactions, the symbol "+" represents any recognisable degree of agglutination which can be made out with a

of 1/32 was either demonstrably a case of typhus or very strong grounds existed for regarding the case as suffering or as having recently suffered from the disease. The table also shows that the agglutinative power of the blood persists for a considerable time after recovery, not so long as in the enteric group infections but long enough, nevertheless, to enable one to arrive at a retrospective diagnosis up to several weeks after recovery

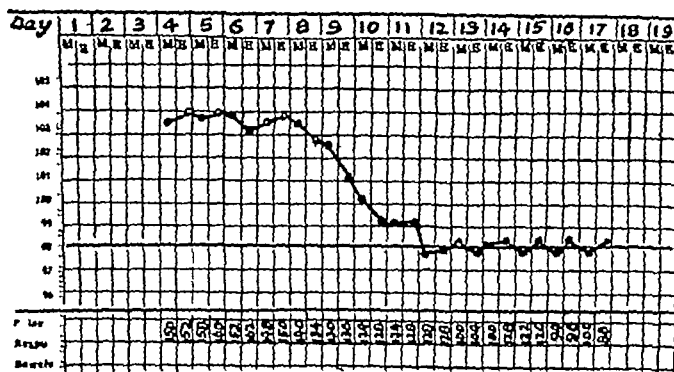
Case 10



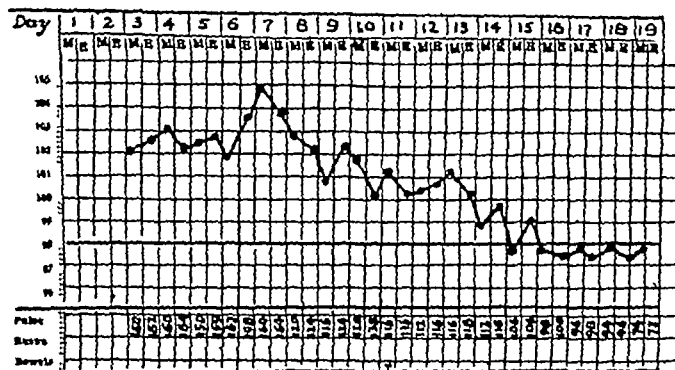
Case 13



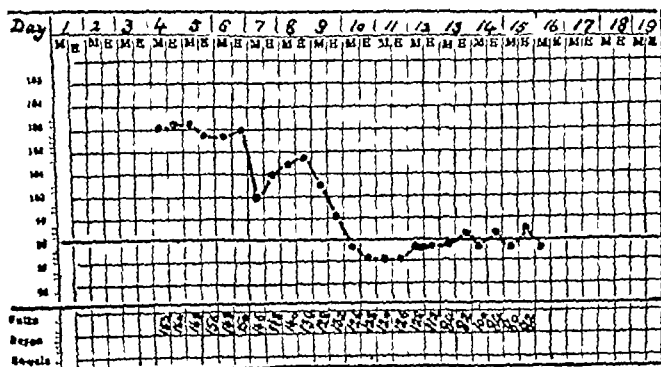
Case 11



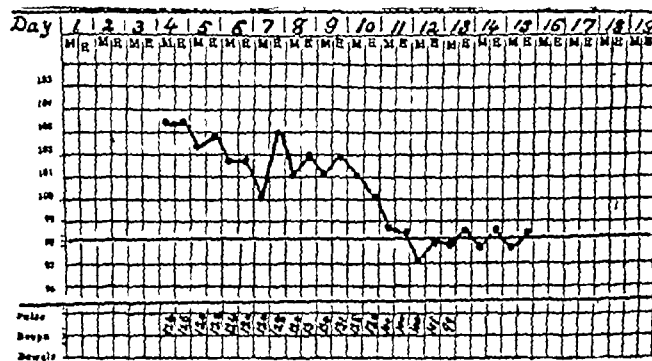
Case 14



Case 12



Case 16



hand-lens after 9 minutes rotation of the glass slab of the agglutinator at room-temperature

The sera of 12 cases known or suspected to be suffering or to have suffered from typhus gave a positive reaction in dilutions varying from 1/16 to 1/2048, with one exception, an almost moribund case whose serum was tested only once on the 4th day of the disease. Every case which gave a reaction in a dilution

from the disease, a point of some importance in investigating outbreaks of obscure fever, if, as in the Simla outbreak, the investigation is started during a temporary lull in the epidemic

*Control experiments with non-typhus sera*—In the Widal reaction it is well known that normal sera may possess some degree of agglutinating power for the particular organism against which the serum is being

tested. The Weil-Felix reaction is no exception to this rule, and it is of importance to know within what limits normal sera may react with *B. protius* Y 19. To arrive at a tentative conclusion on this point a series of 100 normal sera, mostly from lice-infested coolies, were examined with the following results—All failed to shew the least trace of agglutination in a dilution of 1/16, 8 per cent gave a feeble reaction in 1/8, 33 per cent reacted in 1/4, and 59 per cent failed to react at all in 1/4.

#### CONCLUSIONS

The Weil-Felix reaction in Indians is of value (a) in confirming a diagnosis arrived at by clinical observation, (b) in establishing a diagnosis in typical cases in which the clinical evidence of typhus is doubtful, and (c) in arriving at a retrospective diagnosis in cases which have recovered, provided the interval since recovery is not too great.

My experience with the reaction in the Simla outbreak suggests that, employing Garrow's technique in the manner described above a positive reaction in a serum-dilution of 1/32 and upwards is, for practical purposes, diagnostic of typhus fever. Further observations in other outbreaks and by other methods will be necessary before a definite standard can be arrived at for use in Indian epidemics of typhus.

### ON A PSEUDO-ORGANISM IN THE BLOOD IN DENGUE

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**Introduction**—The view that dengue is a spirochætal disease is one which has been entertained by many workers, although the arguments upon which such a theory rests appear to the writers to be but slender. Owing to its rather distant resemblances to yellow fever, to ictero-hæmorrhagic jaundice and to the relapsing fevers, to its proved *Aedes* (*Stegomyia*) transmission (Cleland, Bradley and McDonald, 1916, and Chandler and Rice 1923) and possible *Culex* transmission (Graham, 1903, Craig, 1907), to the very considerable volume of experimental work upon the virus of dengue attended with negative results,—which might be compatible with the presence of a leptospira in the blood in very scanty numbers only, a view appears to be prevalent that the causative micro-organism of dengue is probably a spirochæte.

The positive findings in favour of such a view up to the present date are as follows—

(1) Couvy (1921), in the 1920 epidemic in Beyrouth saw five or six times very scanty

spirochætes in the blood on dark ground examination of dengue cases one to two hours before the onset of fever. He described the organism as an extremely thin spirochæte with tapering ends and with only 2 to 3 turns.

(2) Couvy (1922), in a second epidemic in 1921 in Beyrouth again found the same spirochæte in the blood of dengue cases, not only before the onset of fever as in 1920, but at from 3 to 48 hours after the febrile onset. The blood of dengue cases was inoculated into rabbits, fever of a dengue type followed with the same spirochætes present in the animals' blood during both the primary fever and the secondary rise of temperature. The spirochæte was passaged from rabbit to rabbit. In some areas neither *Aedes* nor *Culex* mosquitoes were present, and his experiments incriminate *Phlebotomus papatasi* as the insect carrier in connection with the epidemic.

(3) Lieut-Colonel J. W. D. Megaw, I.M.S., in 1921 found on dark ground examination of blood taken from a typical case of dengue during the first few hours of the disease one single form representing a leptospira. This observation was not published, as it was a solitary finding only, but was mentioned in a footnote to his 1923 paper (Megaw, 1923). Thanks to Colonel Megaw's kindness we are here able to reproduce a sketch taken at the time of the appearances presented by this organism (figure 1).

(4) If we accept Colonel Megaw's views, (Megaw, 1923)—that sandfly fever and dengue are essentially fevers of the same clinical type and should be classified as sandfly-dengue and mosquito-dengue respectively, then we may here include the finding by Couvy (1921) of a spirochæte in the blood of two cases of sandfly fever at 3 and at 24 hours after the onset of the fever, with successful passage of the virus to a rabbit who contracted fever and shewed spirochætes in its blood at the time of onset of the fever. Also the findings by Whittingham (1922) on sandfly fever in Malta. Spirochætes were found on dark ground examination of direct blood cultures in 6 out of 26 cases, and three primary strains were established in sub-culture.

We are a little doubtful, however, to what extent the view that dengue and sandfly fever are the same disease can be accepted, and it is to be noted that Whittingham's organism differed entirely from Couvy's spirochæte of dengue, the former "being morphologically indistinguishable from *Leptospira icterohæmorrhagiae*, the average length being 10 to 15  $\mu$ ".

(5) Vervoort (1922), during an epidemic in the Dutch East Indies of an acute fever of benign type associated with rheumatoid and vaso-motor symptoms and occasionally with a terminal rash and jaundice, isolated in five cases a spirochæte resembling *L. icterohæmorrhagiae* and *L. hebdomadis* in blood films, in cultures, and once in an inoculated guinea-pig. Guinea-pigs proved very susceptible to the infection. Whether Vervoort was dealing with dengue or not we cannot say,

but the symptoms described are suggestive of dengue

(6) van de Velde (1923), working in Sumatra, found a leptospira resembling *L. hebdomadis* in the blood of 23 out of 430 cases of an unclassified fever. The author notes, however, that only two of the cases shewed symptoms suggestive of dengue

The experimental evidence that dengue is a spirochætal disease therefore rests chiefly upon Couvy's findings. On the other hand the experimental evidence against the spirochætal hypothesis is very strong. Apart from the large volume of earlier work with completely negative results, one may instance the work of Koizumi, Yamaguchi and Tonomura (1917) in the 1915 epidemic in Formosa. These workers proved the infectivity of the blood in even as small an amount as 0.00005 ml but failed to find any micro-organism. Finally Chandler and Rice (1923), working in a Texas epidemic, "made every effort to find such an organism (leptospira) if it were present." They examined 250 preparations from 70 cases by dark ground examination and numerous stained slides, but found nothing. In a few cases the urine was centrifuged and examined, but with negative results. Strenuous efforts to discover a leptospira by cultural methods and all attempts to infect experimental animals were with negative results. They proved transmission by *Aedes (Stegomyia) ægypti*, but failed entirely with *Culex quinquefasciatus*. The incubation period of the disease after the bite of an infected mosquito varied from 4 to 6½ days. This most carefully controlled and thorough enquiry led these workers to the conclusion that there is no real evidence that dengue is a spirochætal disease and that its analogies with yellow fever have been over-emphasised.

Under these circumstances, and in view of the entirely contradictory character of the findings and views prevalent, we determined during the 1923 epidemic of dengue in Calcutta to lay aside all other work as far as possible for the time being, and to seize upon this opportunity to investigate the facts. Our results may be of some interest, as for a period of several weeks we were almost assured that we had isolated a true leptospira as the micro-organism of dengue, but the final and cumulative weight of the experimental findings, and especially those in the controls, force us to the conclusion that the forms observed were artifacts of a new and puzzling character. We may add that Chandler and Rice's paper did not come to hand until nearly the conclusion of our enquiry, which lasted from July the 25th to September the 30th, 1923.

*The Calcutta Epidemic of 1923*—The dengue epidemic of 1923 in Calcutta was one of the worst that the city has ever experienced. From July to the end of September, Calcutta was almost prostrated by the disease. Probably some 40 per cent of its inhabitants suffered from one or more attacks of dengue during this period. Thus at the University Students' Hostel, out of 260

students in residence no less than 165 went down with dengue. The economic importance of dengue is very considerable. Every case contracted means the loss of one week of working time by the individual, to say nothing of the after-effects and impaired working efficiency, and the epidemic must have cost Calcutta city, and its mercantile community especially, some lakhs of rupees in time and labour lost.

It would appear, further, that the Calcutta epidemic was but part of a more widespread pandemic. Bombay suffered severely in March to May, 1923, Lucknow and Delhi were suffering severely in September. The whole countryside around Calcutta within a radius of 40 miles was affected, and isolated cases—mostly among new arrivals from Calcutta—were reported in such hill stations as Ranchi, Shillong and Darjeeling.

The clinical aspects of the epidemic it is for other writers to deal with. The fever usually lasted for 3 or 4 days only without a secondary rise, but such secondary rise about the (5th or 6th ?) 7th day was seen in some 20 per cent of the cases. The rash, coming out on the 4th day as the temperature fell, was well seen in many cases and was even followed by superficial desquamation. The joint pains were intolerable in some cases and tended to persist, together with some swelling of the ankles, for weeks together in convalescence. What was especially noticeable was the special tendency to relapses (? re-infections) in the same individual. Thus person after person would suffer from two or even three attacks of dengue during the three months, and the second or third attack might prove more severe than the first. Of immunity acquired during the actual dengue season itself there was but little clinical evidence. On the other hand certain individuals who had contracted dengue in previous years escaped scot free, and it would appear that the immunity-response to dengue is but slowly acquired over a period of some months, but that when acquired it may be very real. Possibly the virus of dengue may pass out of the blood stream at a very early stage of the disease into the connective and ligamentous tissues, to remain there for a period of some weeks or months, slowly dying out, responsible for the after-pains, but also acting as a slow and cumulative antigen. Any such hypothesis, however, must await proof or disproof until the causative organism has been discovered.

We had no lack of clinical material for the enquiry, indeed the enquiry itself was hampered by attacks of dengue among the laboratory personnel. In the Carmichael Hospital for Tropical Diseases some 30 per cent of general in-patients contracted dengue in addition to their primary disease. Day after day kala-azar cases who had had a normal temperature for weeks and were well on the way to cure would suddenly go down with dengue and look pictures of misery. Two malaria patients,—one a benign tertian and the other a quartan,

as proved by blood examination—contracted dengue within 20 days of their last malarial rigors, although at the time on full cinchona treatment. In a third instance a laboratory worker at the School contracted a severe attack of dengue, recovered, and three weeks later went down with benign tertian malaria, trophozoites and schizonts of *P. vivax* being present in his blood. We mention these three cases because of the view entertained in some quarters (Ingram Johnson 1921,

within the first 4 to 6 hours of the onset of fever and symptoms

*Direct Blood Examinations*—The blood of 32 typical cases of dengue was examined by the following technique—

(a) Air dried and Leishman-stained films were searched. No parasite of any type was encountered.

(b) Under aseptic precautions a small drop of blood was mixed on a thin glass slide with a larger drop of sterile citrate saline, covered with a thin cover slip, the preparation ringed with vaseline and searched under dark

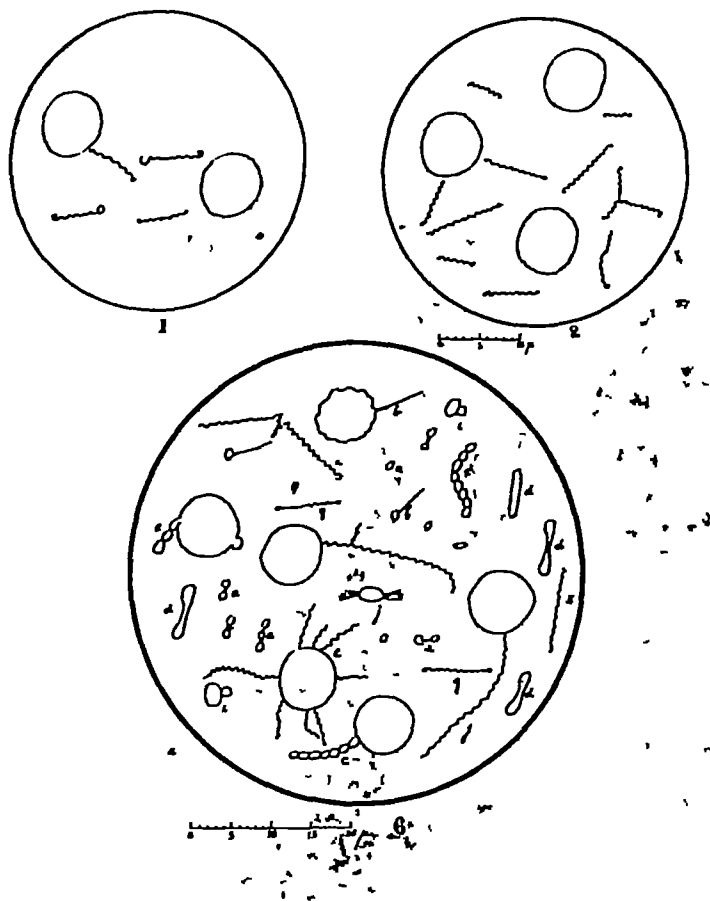


Fig 1—Leptospira-like form seen by Col. Megaw in the blood of a dengue case. Sketches of the same form seen at different intervals of time.

Fig 2—The leptospira-like artifact described in the text, as seen on dark ground examination of dengue bloods, cultures and the blood of inoculated animals.

Fig 6—The puzzles and fallacies of dark ground examination of blood

- (a) The hæmoconia particle. (b) The straight non-motile streamer (c) The chain streamer (d) The pessary body (e) The multiple short streamers (f) The long, motile, filamentous streamer (g) The leptospira-like artifact (h) Yeasts (i) A short motile bacillus

1923), that in some vague way dengue and malaria are antagonistic diseases. In one instance an infant three days old contracted dengue, the mother also going down with the disease within a few hours of its onset in her infant.

The personnel and establishment at the School and Hospital suffered wholesale from dengue, and durwans, animal attendants, ward boys and sweepers would visit the laboratory to be bled

ground examination for not less than 15 to 20 minutes. Examination was with a Leitz 1 1/2 inch oil immersion lens with funnel stop and No. 6 periplanatic ocular, the No. 15 periplanatic ocular being substituted if anything suspicious was encountered. In most cases two such preparations were searched from each patient, in many from 4 to 6 per patient.

The results were that in 10 out of these 32 cases there were found in very scanty numbers motile forms which appeared to be typical leptospiræ. They varied in hardly any particular other than length. They seemed



to be actively motile with movements of forward and backward progression, often diving down into the fluid and then coming up again as is so characteristic of spirochæte movement. The length varied from 4 to  $20\mu$ , but was usually about 8 to  $9\mu$ . Of 56 specimens roughly measured with the ocular micrometer whilst still motile the average length was  $78\mu$ . As a rule



Fig 3—Microphotograph of the leptospira artifact from a culture. Short form. Schaudinn's fixative, iron hæmatoxylin stain

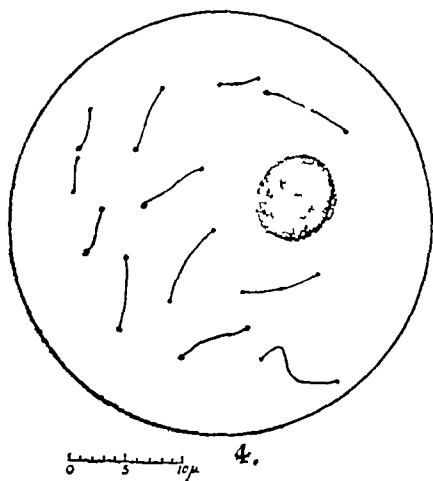


Fig 4—Camera lucida drawings of the same from a culture. Same fixative and stain



Fig 5—Microphotograph of the same artifact, long form, as produced in heated non-dengue blood. Same fixative and stain

these forms were brightly refringent when compared with the pseudo-spirochætes or erythrocyte streamers, but the appearance with regard to this point varied considerably with the lighting. They were fairly flexible, but less flexible than *T. pallidum* or *T. pertenuis*. About 10 to 12 very regular and symmetrical turns would be present in a form 8 to  $9\mu$  in length

The most characteristic feature of these forms, however, was the *invariable* presence, either at one, but almost always at both ends, of what appeared to be a bead or spore. These beads were spherical, larger in diameter than the body of the ? organism, and much more refractile. They appeared as if loosely adherent to the ends of the spirochæte. Figure 2 illustrates the appearances presented by this leptospira-like form when studied under dark ground illumination.

These forms were found in dengue bloods (a) in perfectly freshly drawn blood within five minutes of shedding and in the first or second field examined, (b) in the complete absence of all such artifacts as erythrocyte streamers, pseudo-spirochætes, etc., indeed on several occasions where these leptospira forms were found the films were searched for prolonged periods for such artifacts without their being encountered, (c) together with such artifacts in blood which had been under examination for some 15 to 20 minutes. Finally they were always present only in very scanty numbers, from 2 to 6 per dark ground preparation. Also the findings were consistent, if one drop of blood from a patient was positive, the same forms would be encountered in the next two or three preparations from the same patient.

With regard to the duration of fever in these cases the findings were as shewn in Table I

TABLE I

*Direct Blood Examination of Dengue cases*

Duration of fever	No of cases examined	No positive	No negative
Less than 12 hours	11	3	8
13 to 24 hours	6	3	3
2nd day	11	3	8
3rd day	3	1	2
7th day	1	0	1
Totals	32	10	22

With regard to these cases the positive case at the 3rd day was a patient whose temperature had just dropped to normal. The 7-day case was a patient who developed severe jaundice without fever on the 6th day. 200 c.c. of his urine was centrifuged in a sterile tube by centrifugalisation of repeated 20 c.c. samples in the same tube, and the deposit thoroughly searched under the dark ground. No spirochætes were found. In another case with two days fever the urine was also examined by the same technique but nothing found. In one patient, whose blood has just shewn positive findings and who had an enlarged spleen, spleen puncture was carried out, but no spirochætes were detected and no parasites upon culture. Liver puncture was also carried out in one patient at the 6th day of dengue, with cultures taken, but again with entirely negative results.

We next did our best to try and improve upon these findings. From positive cases, series of blood films were taken, stained by different methods and examined. In four positive cases blood was collected, allowed to clot in the  $37^{\circ}\text{C}$  incubator and the serum examined at intervals up to 48 hours. No spirochætes were detected. In the case of a patient whose finger blood had just yielded positive findings, blood was taken from the vein into citrated saline and heavily centrifuged and the three layers examined. No spirochætes could be detected in the supernatant fluid or in the leucocyte layer, but they were present in fair numbers in the erythrocyte deposit. This was again repeated on two further positive cases, one shewed similar findings, the second shewed the organism present in all three layers.



To facilitate further reference we may add that the positive findings occurred in serial cases Nos 5, 8, 9, 11, 13, 14, 24, 25, 26 and 28

**Blood Cultures in Dengue Cases**—Blood cultures were taken simultaneously with the direct blood examinations. At first we used the medium suggested by Kaneko (1921) for *L. hebdomadis*, viz., one c.c. of rabbit blood added to 5 c.c. of Ringer's fluid at 45°C on the water bath. From three positive cases and one negative case (Nos 9, 11, 12 and 13) sixteen cultures were put up, incubated either aerobically or anaerobically at 22° C and at 37° C and repeatedly examined up to 21 days. 14 of them remained sterile, none showed any leptospira forms in culture.

We turned therefore to the modified Wenyon-Noguchi medium used by Whittingham (1922) for the leptospira found in his cases of sandfly fever, following his technique for pH standardisation and using at first rabbit blood, later human blood, in preparing the culture medium. We did not however, obtain the rabbit's blood by the method advocated by Wenyon (1921). We have repeatedly tried in Calcutta to prepare media containing rabbit blood by venipuncture of the marginal vein of the rabbit's ear as advocated by Wenyon, and in every instance sepsis has resulted. In fact in the septic atmosphere of a laboratory in Calcutta during the monsoon season with numerous animals being brought into the laboratory daily for examination this method is quite unsuitable. Instead we bled the rabbit by cardiac puncture, using in the 20 c.c. Roux syringe employed the minimum amount of citrated saline needed to prevent clotting, and then dropping the blood drop by drop from the syringe into the melted medium. We take it that the essential feature of Wenyon's modification is to get a tube with a network of fibrin, and this

is obtained by the method which we adopted. Sepsis indeed is a special difficulty in all cultural work in Calcutta during the monsoon period, and we found it necessary to autoclave all media twice and to keep all tubes prior to inoculation in the 37° C incubator.

The results of the primary cultures on this medium are shown in Table II.

Twenty-four out of 53 tubes inoculated from 13 typical cases of dengue showed forms exactly similar to those encountered on dark ground examination of dengue bloods. These commenced to appear in culture about the 5th day, seemed as a rule to be most numerous about the 8th or 9th day, and then seemed to disappear, although one tube remained positive for 28 days. At no time could any culture be termed "rich," the forms seen in these cultures appeared to be considerably more numerous than those seen on direct blood examination, about 5 to 20 per dark ground preparation, but multiplication seemed to be very slow indeed, and it appeared as if we were dealing with a true leptospira, but had not yet struck the best culture medium for it.

We next did our best to improve upon these results, transferring positive tubes from 22° C or from room temperature to the 37° C incubator, trying centrifugalisation methods in order to obtain concentration of the virus, using media prepared with ascitic fluid in place of blood and adding sterile rabbit and guinea-pig kidney, etc., but with no results. Sub-cultures on these media were tried, and also 4 batches, each of 6 tubes of sub-cultures on Whittingham's medium from positive primary cultures. Cultures were also plated out on glucose agar and on blood agar plates. In none of these, however, did we find any leptospira forms.

Hitherto all attempts at obtaining stained preparations of the leptospira form seen had been fruitless. On centrifuging positive cultures and preparing films, however, we at last succeeded in obtaining stained preparations. The methods of fixation and staining used were (a) wet fixation with Schaudinn's fixative, followed by Haidenheimer's iron-haematoxylin method of staining, which is admittedly one of the best procedures for true cytological study (b) Prolonged staining with very dilute Giemsa's stain after fixation with osmic acid vapour and methyl alcohol (c) Fontana's stain after preliminary fixation with methyl alcohol (d) Leishman's stain. Method (c) we discarded early as the resulting film is so full of deposit on fibrils of fibrin, etc., that one cannot be certain of what one is looking at.

Stained preparations by methods (a) and (b) having been obtained, however, were now carefully searched, and here a surprise awaited us. The forms seen in stained preparations were always exceedingly scanty, far more so than those seen under dark ground examination of the same material, some 3 to 4 per slide only. In all we have seen and studied some 40 of these forms as seen in preparations stained chiefly by method (a), whereas we have seen hundreds under dark ground illumination. But whereas under dark ground illumination the forms seen appeared to be typical leptospiræ, in the stained preparations they showed little or no resemblance to leptospiræ at all. With iron-haematoxylin staining the density of staining varies very much, often the organism is completely decolourised, many stain faintly but with the terminal beads staining deeply, a few stain deeply. Figure 3 is an untouched microphotograph of such a form from a positive primary culture from a dengue blood.

With Giemsa's stain the terminal beads stain deeply blue and the body of the organism deeply pink. With Leishman's stain the terminal beads stain deeply red and the body of the organism a pale violet. In a few instances the organism appeared to be almost straight and resembled a bacillus with metachromatic staining. In almost every specimen seen there is a sinuous curvature, the terminal beads are very prominent and the stained forms very much recall the old English letter *f*, the body being thin and the terminal beads staining

TABLE II  
Primary Blood Cultures from Dengue Cases

Medium employed	Inoculated from case	Result of examining patient's blood	Total No of cultures	AEROBIC			ANAEROBIC		
				22° C	Room temp	37° C	22° C	Room temp	37° C
W R	14	+	6	1+	1+	1×	1-	1+	1-
W R	15	-	2		1+			1×	
W R	16	-	4		2+			2×	
W R	18	-	2	1-	1-				
W R	23	-	6	1×	1+	1×	1×	1×	1×
W R	24	+	2	1+			1-		
W R	25	+	2	1+			1+		
W R	26	+	4	1+	1+		1+	1-	
W H	27	-	3	1+			2-		
W H	28	+	4	1+	1+		1+	1+	
W R	28	+	4	1-	1+		1-	1-	
W H	29	-	4	1+	1-		1-	1+	
W R	29	-	4	1-	1-		1+	1-	
W H	30	-	4	1+	1+		1-	1-	
Glucose broth	31	-	2	1-		1-			
Summary 24 cultures + out of			53	8+	9+	0+	4+	3+	0+
From cases with blood findings +			22	5+	4+	0+	3+	2+	0+
From cases with blood findings -			31	3+	5+	0+	1+	1+	0+

NOTE.—W R—Whittingham's modification of Wenyon-Noguchi medium made with rabbit's blood and standardised to pH 7.2

W H—The same, prepared however with human blood from non-dengue persons in place of rabbit blood. + indicates that leptospira like forms were found, — that none were found and the culture remained sterile. × that the culture went septic.

deeply. The appearance of minute elementary spirals running throughout the body, so characteristic of leptospira spirochaetes, and so well seen with this pseudo-organism in dark ground preparations, was *not* to be discovered in the stained preparations. Figure 4 of the plate illustrates the forms met with in stained preparations. We now began to wonder whether the organism with which we were dealing was indeed not a spirochaete at all, but a spirosome or some similar form.

*Animals inoculated with the blood of dengue cases*—Animal inoculation was resorted to throughout and every attempt made to transmit the virus to animals and to establish an animal strain for further experimental

probably due to the introduction of foreign proteids into the blood stream. The phenomenon is not constant, however, as it often fails to occur.

After this, the temperature drops usually a little, or—sometimes—considerably. Thereafter, however, the animals shewed for from 10 to 30 days an irregularly febrile temperature chart. Considerations of space here prevent our going into details, but the temperature chart of rabbit No 15 which is shewn as Chart II is typical of the whole series in inoculated rabbits and monkeys (but not of the inoculated guinea-pigs). Despite their apparently febrile state, these animals shewed no other apparent symptoms.

TABLE III

*Animals inoculated with Dengue Bloods or Dengue Cultures*

Animal	Dose given	How given	Donor	Findings in donor's blood or culture	No of days during which animal was subsequently observed	Blood findings in animal after inoculation	REMARKS.
M 1	5 cc	I V	Case 1	—	31	5 times + on 22 examinations	Culture from Case 16
M 2	4 cc	I V	Case 2	—	16	Once + on 12 examinations	
M 3	3 cc	I P	Culture	+	10	Never + on 7 examinations	
M 4	5 cc	I V	Case 3	—	31	Once + on 16 examinations	Passage
M 5	5 cc	I V	Monkey 1	+	41	Twice + on 18 examinations	
G P 1	5 cc	I V	Case 8	+	31	3 times + on 21 examinations	
G P 2	5 cc	I P	Case 1	—	14	Never + on 11 examinations	Passage
G P 3	5 cc	I P	Case 2	—	13	Never + on 10 examinations	
R 1	5 cc	I P	Case 16	—	11	Never + on 7 examinations	
R 2	2 cc	I V	Case 2	—	11	Once + on 8 examinations	Passage
R 3	2 cc	I V	Case 3	—	11	3 times + on 9 examinations	
R 4	5 cc	I P	Case 4	—	30	10 times + on 22 examinations	
R 5	5 cc	I P	Case 5	+	6	Twice + on 5 examinations	Died, 7th day
R 6	5 cc	I P	Rabbit 1	+	18	Once + on 14 examinations	Passage
R 7	3 cc	I P	Case 23	—	10	Once + on 8 examinations	Vide Table V I
R 8	5 cc	I P	Culture	+	10	Never + on 7 examinations	
R 9	2 cc	I V	Case 7	—	2	Twice + on 2 examinations	
R 10	5 cc	I P	Rabbit 7	+	25	4 times + on 18 examinations	Passage Killed 2nd day
R 11	5 cc	I P	Rabbit 2	+	29	3 times + on 15 examinations	Died 12th day
R 12	5 cc	I V	Case 9	+	12	Once + on 8 examinations	
R 13	5 cc	I V	Case 10	—	18	4 times + on 14 examinations	
R 14	4 cc	I V	Case 11	+	11	5 times + on 7 examinations	Died 19th day
R 15	4 cc	I V	Case 11	+	18	5 times + on 13 examinations	Died 11th day
R 16	5 cc	I P	Case 12	—	23	5 times + on 16 examinations	
R 17	5 cc	I V	Case 13	+	23	7 times + on 17 examinations	
R 18	4 cc	I V	Case 15	—	23	9 times + on 15 examinations	
24 animals					18 (average)	75 times + on 320 examinations	

Notes—M, monkey G P, guinea-pig, R—rabbit I P, intra peritoneally I V, intravenously. The bloods used were all citrated.

work. The findings for the 24 inoculated and 2 re-inoculated animals are shewn in Table III. The results are of considerable interest (The controls will be dealt with later).

What we found in general was that after intravenous inoculation of dengue blood into an animal the first result was an immediate reactionary rise of temperature. Thus rabbit No 12 shewed a rectal temperature of 103° F just before inoculation, but an hour after the injection of 4 cc of dengue blood intravenously its rectal temperature was 105.4° F. Rabbit No 13 shewed a temperature of 101° F just before inoculation, it then received 4 cc of citrated blood from dengue case No 11 intravenously, plus 4 cc of the same blood intra-peritoneally, an hour later its rectal temperature was 104° F. This is a well-known phenomenon and is

Turning to the findings, in these experimental animals—

(a) Three guinea-pigs inoculated intra-peritoneally with the blood of dengue cases Nos 1, 2 and 16 never shewed any leptospira forms on blood examination. Their temperatures ranged from 102° to 104° F, with a mean on 30 observations at 102.8° F. The normal rectal temperature of the guinea-pig is stated by Archibald (1921) to range between 38.5 to 39.4° C, (101.3 to 102.9° F) with a mean at 38.7° C (101.7° F), and these animals can scarcely be regarded as having been more than slightly febrile. On 28 examinations of their blood no leptospira forms were ever seen, and it would appear as if the guinea-pig was relatively insusceptible to experimental infection with dengue, although relatively susceptible to infection with other

leptospira infections,—a point also noted by Chandler and Rice

(b) Of four adult *M. rhesus* monkeys inoculated intravenously with the blood of dengue cases all subsequently showed fever or apparent fever. The temperatures ranged from 100.2 to 106°F, with a mean on 76 observations at 102.9°F. Archibald (*loc cit*) quotes a range of from 94.8 to 104°F with a mean at 101.1°F for the *rhesus* monkey, and in general these four monkeys appeared to run an irregularly febrile chart for the 10 to 31 days that they were under observation. Chart I is typical of the findings in these monkeys. All of them showed the same typical leptospira-like forms on blood examination,—10 positive findings on 69 examinations.

In addition to this monkey No 2, inoculated intraperitoneally with a dengue culture shewing leptospira forms, ran for 10 days a temperature oscillating from 101.6 to 104°F, with a mean at 103.2°F, but showed no leptospira forms on 7 examinations. Monkey No 4 was a passage monkey from the venous blood of monkey No 1 at a moment when the latter's blood showed leptospira forms. For 41 days it ran an irregularly febrile chart ranging from 102.6 to 104.6°F, with a mean at 103.5°F, it also showed leptospira forms on 2 out of 18 examinations.

(c) Thirteen rabbits were inoculated either intravenously or intra-peritoneally or by both routes simultaneously with the blood of dengue cases. All of them subsequently showed apparently irregularly febrile temperature charts for periods up to a month, and all of them showed the same leptospira-like forms in their blood. The normal temperature of a rabbit is given by Archibald (*loc cit*) as from 37.3 to 39.9°C (99.1 to 103.8°F), with a mean at 39.2°C (102.6°F). Chart II is a typical example of the findings in these rabbits. These 13 rabbits were observed over periods ranging from 2 to 30 days and showed temperatures ranging from 102.4 to 107°F, with a mean on 139 observations at 103.9°F. Leptospira forms were encountered on 45 out of 144 examinations.

In addition to this rabbit No 5—an intravenous passage from rabbit No 1 at a moment when the latter's blood was positive,—showed temperatures ranging from 102.4 to 104°F, during the next 18 days, with a mean at 103.4°F, on 14 observations leptospira forms were only seen once in 14 observations—on the 7th day after inoculation. Rabbit No 8, a passage from rabbit No 7 when the latter's blood was positive, showed a chart ranging from 102.6 to 104.6°F, with a mean at 103.6°F on 17 observations, during the next 25 days, and leptospira forms on 4 out of 18 examinations. Rabbit No 9, a passage from rabbit No 2 at a moment when the latter's blood was positive, showed temperatures ranging from 102.8 to 107°F, with a mean at 104.2°F, on 13 observations. This rabbit for some reason showed rectal temperatures of 107°F and 106°F on the 27th and 29th days after inoculation, with typical leptospira forms present on both days. Rabbit E inoculated with a positive 28 days culture, showed temperatures varying from 103.4 to 106.6°F during the next 10 days with a mean at 105.2°F on 7 observations, but no leptospira forms on 7 examinations.

The reader may ask why we did not concentrate our attention only upon such dengue cases as showed positive findings on blood examination, and inoculate animals only with such selected material. The reasons why we did not do so were two-fold. First we were anxious to work with consecutive, unselected material, as long as the patient showed typical symptoms of dengue he was used. In the second place the pressure of work with only two investigators and one laboratory assistant was such that whilst one worker was examining the peripheral blood the other did venipuncture and carried out the inoculation of animals and cultures, and we frequently did not know whether the blood was positive or negative until after the inoculations had been carried out. As a matter of fact all the monkeys and rabbits inoculated from dengue cases, whether such cases did or did not shew the leptospira forms in their

blood, subsequently shewed what was apparently fever of an irregular type, and all yielded positive leptospira findings. It also appeared as if those inoculated from dengue cases whose blood was positive gave a heavier incidence of positive findings, 32 per cent., than did those inoculated with negative bloods, 29 per cent. as will be seen from Table III.

Four animals in the series died, viz, rabbits Nos 4, 10, 11 and 13. These were most carefully examined post-mortem and their heart blood and emulsions of the viscera searched for leptospira forms. None were encountered. The cause of death could not be established in any of these four animals, but a mortality of 4 out of 24 animals kept under experimental conditions for periods of from 10 to 40 days probably does not exceed the normal.

Every attempt was next made to secure permanent stained preparations from the blood of the positive animals, using thin and thick films, trying centrifuge methods, etc., but—as with the human bloods—we again failed to get stained films of the leptospira forms encountered. Rabbits Nos 2 and 7 were killed at times when their blood showed leptospira forms present and their cardiac blood immediately passaged into fresh rabbits. A thorough search of emulsions of all viscera,—liver, lungs, spleen and kidneys—and of the urine present in the bladder failed to shew any leptospira forms.

*Cultures from positive animals*—From such inoculated animals as proved positive we next attempted to recover the organism in culture. The results are shewn in Table IV.

TABLE IV

*Cultures from the Blood of Animals Positive in Table III*

Medium used	Inoculated from animals	Total No of cultures	AEROBIC			ANAEROBIC		
			22°C	Room Temp	37°C	22°C	Room Temp	37°C
K	M 1	4	2—		2—			
K	R 1	4	1—		1—	1—		1—
K	R 2	4	1—		1—	1—		1—
W R.	R 9	5	1+		1+	1+	1+	
W R.	R 12	3		2+1—				
Glucose broth	R 13	1			1—			
W R.	R 14	2	1×		1×			
Glucose broth	R 12	1			1+			
W R.	R 15	2	1—	1+				
Summary (W R.)		12	1+4+		1+	1+	1+	0+

*Notes*—K, Kaneko's medium W R, Whittingham's modification of Wenyon-Noguchi medium made with rabbit's blood M, Monkey, R, rabbit.

+ Culture shewed leptospira forms,—culture remained sterile but shewed no leptospira forms, × culture became septic.

As with the human dengue cases, here again we failed with Kaneko's medium, but succeeded with Whittingham's modification of Wenyon-Noguchi medium,—8 out of 12 cultures positive. Sub-cultures were next put up, and at last, in one solitary instance, a sub-culture from a positive culture from rabbit No 9, leptospira forms were found on the 6th day. The other sub-cultures were negative.

In general, with regard to the animals inoculated with the blood of dengue cases, with positive cultures shewing

leptospira forms, or as passages from inoculated and positive animals, we may conclude —

(1) That guinea-pigs appeared to be absolutely resistant. They shewed neither definite fever nor leptospira findings.

(2) That rhesus monkeys and rabbits, after a preliminary and transient rise of temperature due to the injection of foreign proteid, tended to shew for from the 10 to 40 days during which they were kept under observation an erratic and generally febrile temperature chart with from time to time leptospira-like forms present in the blood in very scanty numbers.

(3) Cultures from the blood of such animals again yielded the same leptospira-like forms from the 6th to the 20th day, and one successful sub-culture had been obtained.

We next investigated the question of any possible correlation between the leptospira findings and the degree of fever present. The findings are shewn in Table V.

of 55 examinations were positive, at 106 to 107°F 58 per cent of 19 examinations were positive. The numbers dealt with are too small for any detailed analysis, but there does appear to be a definite correlation.

*Preliminary Survey*—Before passing to the extremely important subject of controls, we may here attempt a preliminary analysis of the results to date. It will be seen that, although not proved, the trend of the experimental evidence was so far more and more in favour of a leptospira-like micro-organism being the true causative parasite of dengue. Such a leptospira form had been seen in the blood of 10 out of 32 typical cases of dengue and seemed to shew a special association with the early and acute febrile phase. It had been obtained in 24 out of 53 cultures from dengue bloods and from 5 out of 13 dengue cases (Table II). Of animals inoculated with the blood of dengue cases all 3 guinea-pigs had failed to take, but all 4 monkeys and all 13 rabbits had shewn an erratic but febrile temperature chart with from time to time scanty lep-

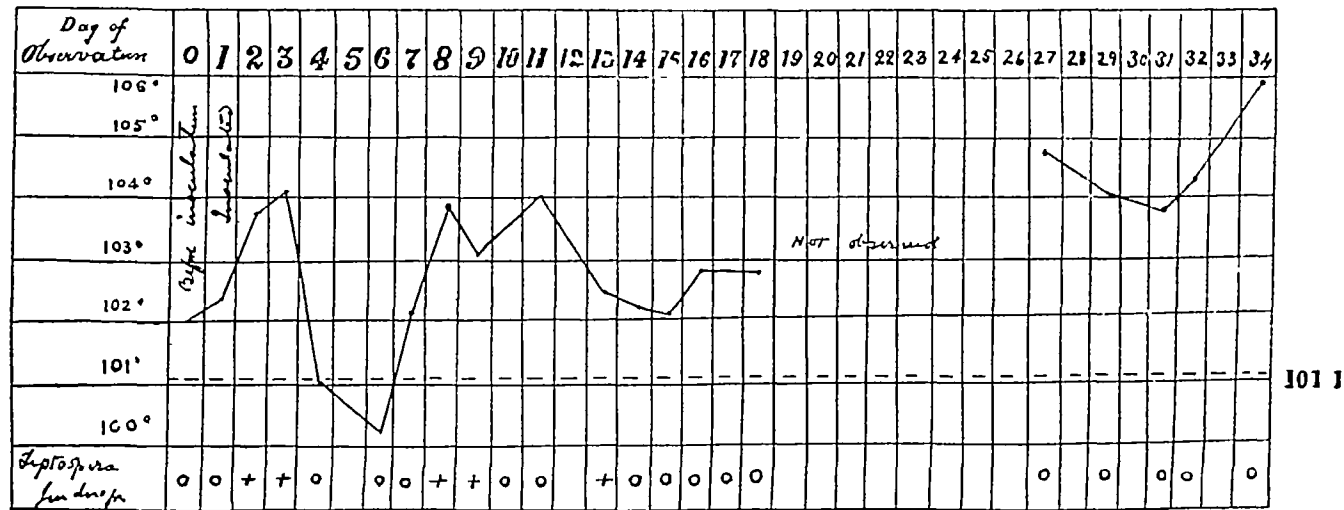
TABLE V  
*Inoculated Animals Correlation between Leptospira Findings and Temperature*

Temperature	MONKEYS			RABBITS			COMBINED		
	+	-	Total	+	-	Total	+	-	Total
100 to 101°F	0	4	4	0	1	1	0	5	5
101 to 102°F	3	5	8	0	0	0	3	5	8
102 to 103°F	5	38	43	0	12	12	5=9%	50	55
103 to 104°F	5	25	31	11	45	56	16=18%	71	87
104 to 105°F	1	5	6	31	43	74	32=40%	48	80
105 to 106°F	0	0	0	14	14	28	14=50%	14	28
106 to 107°F	0	1	1	11	7	18	11=58%	8	19
Totals	14	79	93	67	122	189	81	201	282
Percentage positive	16%			35%			29%		

It will be seen that there is here a distinct correlation between the degree of fever present and the percentage of positive findings. At 102 to 103°F, only 5 per cent

leptospira-like forms in their blood (e.g., Charts I and II). Moreover the positive findings appeared to shew a definite correlation to the degree of fever present. From

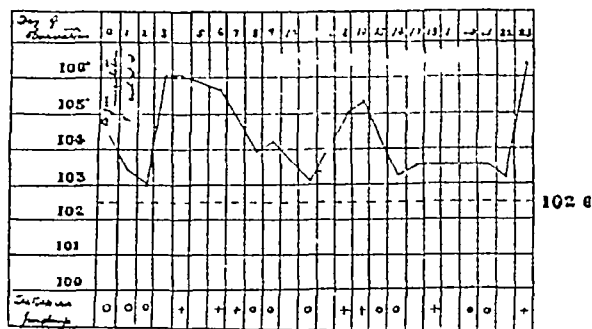
CHART I.



Monkey 15 c.c. of citrated blood from dengue Case I Intravenously

such positive animals the same leptospira-like form had been obtained in primary blood culture, and once in sub culture. With the aid of a little *suppression* *et cetera*

CHART II



Rabbit 15 5 c.c. of citrated blood from dengue Case 13 Intravenously

*suggestio falsi* the whole of this memoir could be easily re-written as evidence very strongly in favour of the leptospira theory of dengue

#### CONTROLS

There were certain facts, however, which gave us furiously to think. In the first place the 'organism' when stained looked nothing like a spirochete (figure 4), yet that these stained forms were the same as the leptospira-like forms seen under dark ground illumination is proved by the almost invariable presence at their ends of the same bead or spore-like process. Secondly, the erratic character of the temperature charts and the irregular alternation of positive and negative findings in the inoculated animals were puzzling. Thirdly, the variability of the findings in the 'positive' cultures, in all of which the leptospira forms seen were scanty, and in some present on 2 or 3 out of 5 examinations, but not discoverable on the other days. From the very beginning our observations were fully controlled, but by degrees the controls became more and more important, until, towards the conclusion of the enquiry, they came to dominate the experimental picture. The control experiments may be grouped as follows—

(1) *Examination of non-dengue bloods*—Fresh blood preparations from 10 healthy persons who had not had dengue during 1923 were thoroughly examined for from 15 to 20 minutes each, the technique used being the same as for the dengue bloods. In addition the blood of the senior writer, who had had an attack of what may have been dengue in 1922, but who went through the 1923 epidemic without shewing a single symptom of dengue, was repeatedly examined. The serum of 4 non-dengue persons was also examined. In none of these preparations was anything resembling a leptospira form encountered, although pseudo-spirochaetes (erythrocyte streamers) were frequently seen.

(2) *Cultures from non-dengue bloods*—Twelve cultures (one each at 22°C, room temperature and 37°C), in Whittingham medium prepared with rabbit blood were inoculated with the blood of 4 non-dengue persons. Glucose broth cultures from 2 non-dengue persons were taken and incubated at 37°C. A culture from the serum of a non-dengue person was also taken in glucose broth and incubated at 37°C, and 3 sets of cultures from non-dengue sera by a method advocated by Dr Helen Chambers (1913) in a paper to which further reference will shortly be made. In none of these although repeatedly examined was anything like a leptospira encountered.

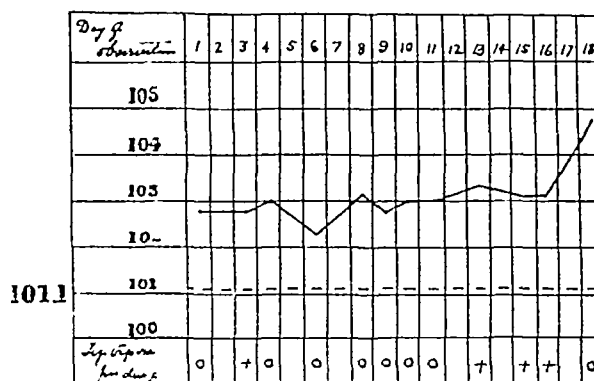
A culture from the senior writer's blood on Whittingham medium made with rabbit blood and kept at room temperature was found, however, to be positive on the

15th day of culture, and shewed *exactly the same leptospira-like forms* in very scanty numbers on dark ground examination. This was admittedly a most puzzling finding.

(3) *Control non-inoculated animals*—Eight healthy and non-inoculated guinea-pigs were taken from the run and were examined. Their rectal temperatures varied from 103.2 to 105°F, with a mean at 104.2°F, this being rather high, as two of them, for some inexplicable reason, shewed temperatures of 105°F. A 9th healthy guinea-pig was taken, caged and placed under daily observation. Over a period of 10 days its temperature varied from 100.6 to 104°F, with a mean at 102.5°F. The blood of all 9 guinea-pigs was examined, and that of the 9th again examined on 8 consecutive days. In none of the 16 examinations was anything like a leptospira encountered.

Seven healthy and non-inoculated rhesus monkeys were taken and examined. Their rectal temperatures varied from 101 to 103.6°F, with a mean at 102.7°F. But here a surprise awaited us. On examining their bloods, no less than 3 of them shewed again *exactly the same leptospira forms* as previously encountered in the human dengue cases, with its characteristic beaded ends. Two other fresh monkeys were taken and placed under daily observation. Of these monkey A, observed for 18 days shewed temperatures ranging from 102.4 to 104.8°F, with a mean at 103.1°F, and with typical leptospira forms present on 4 out of 12 examinations (Chart III). Monkey B, observed for 7 days, shewed

CHART III



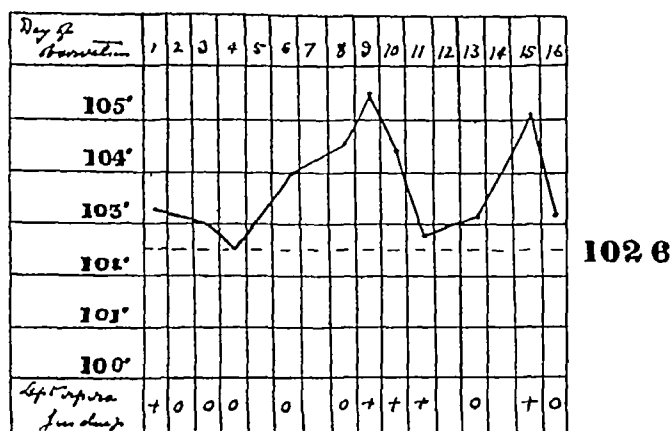
Monkey A Non inoculated control

temperatures ranging from 102 to 103.2°F, with a mean at 102.5°F, but no leptospira forms seen on 4 examinations.

Thirteen healthy and non-inoculated rabbits were taken and examined. Their temperatures varied from 103 to 105°F, with a mean at 104.2°F, and the blood of one of them shewed again *exactly the same leptospira forms as before*. Two non-inoculated rabbits were placed under daily observation. Of these rabbit C, under observation for 16 days, shewed a range of temperature of from 102.5 to 105.6°F, with a mean at 103.8°F, and leptospira forms present on 5 out of 12 examinations (Chart IV). Rabbit D, under observation for 18 days, shewed temperatures varying from 103.2 to 104.8°F with a mean at 103.9°F, and leptospira forms present on 3 out of 13 examinations. As a further control rabbit E may be included. This was inoculated intravenously with the blood of what was thought at the moment to be a dengue case, but on examining the patient's blood no leptospira forms were seen and microfilariae were present, and the case was almost certainly one of filarial fever and not of dengue. Rabbit E, kept under observation for 16 days, shewed temperatures ranging from 103.2 to 105.4°F with a mean at 103.8°F, but neither leptospira nor microfilariae found on 11 consecutive examinations.

Monkey B and rabbit E clearly not infected with dengue and with consistently negative blood findings, were next taken and used as critical animals upon which to test positive dengue cultures. The details of these two experiments were as follows —

CHART IV



Rabbit C Non-inoculated control

(a) Serial dengue case No 16, laboratory sweeper at the School, reported sick with typical symptoms of dengue on the 18th of August. No leptospira found in his blood on examination. A guinea-pig was inoculated intra-peritoneally with his blood with subsequently negative results. Cultures were taken on Wittingham media made with rabbit blood and placed at room temperature, —2 aerobic and 2 anaerobic. The latter went septic, the former were both positive on the 9th day. 3 c.c. of one of these cultures was given intravenously to monkey B and a further 3 c.c. intravenously to rabbit E. The results were as follows —

Monkey B—Before inoculation 4 examinations negative. After inoculation 5 out of 8 examinations positive.

Rabbit E—Before inoculation 11 examinations negative. After inoculation 7 examinations negative. This rabbit however, appeared to shew definite fever for 11 days after inoculation.

The findings in the control animals are summarised in Table VI.

Table VII shows that with regard to the 15 positive and 56 negative findings in the control non-inoculated animals there again appears to be a correlation between the percentage of positive findings and the degree of fever present.

TABLE VII

Non-Inoculated Control Animals, *Leptospira* findings and Temperature

Temperature	MONKEYS			RABBITS			COMBINED		
	+	-	Total	+	-	Total	+	-	Total
101 to 102°F	1	3	4	0	0	0	1	3	4
102 to 103°F	2	8	10	1	6	7	3	14	17
103 to 104°F	3	3	6	4	14	18	7	17	24
104 to 105°F	0	2	2	2	19	21	2	21	23
105 to 106°F	0	0	0	2	1	3	2	1	3
Totals	6	16	22	9	40	49	15	56	71

The figures are too few in number for any definite conclusion on this point, but the temperature chart of rabbit C shews the way in which positive findings seem to go with a high temperature.

(4) *Cultures from non-inoculated control animals*—The finding of the same leptospira-like form in healthy and non-inoculated animals is in itself surprising enough. We took rabbit C (non-inoculated control), on a day when its blood shewed these forms present and inoculated 4 tubes of Wittingham medium made with rabbit blood —2 aerobic and 2 anaerobic, one each at 22° C and at room temperature. Both the tubes at 22° C shewed again typical leptospira forms from the 4th to the 9th days of culture, but both tubes at room temperature remained sterile and negative. Subcultures were attempted from a positive tube but with negative results.

(5) *Summary with regard to Controls*—The position was now exceedingly puzzling. The blood of 10 non-dengue persons had failed to shew any leptospira-like forms, and 12 cultures from 4 of these persons had remained negative. On the other hand a culture from a person whose blood had been persistently negative and

TABLE VI

Findings in Control, Non-Inoculated Animals

Animals observed	Under observation for	Blood findings	Extreme range of temperature	Mean temperature
8 guinea-pigs	Once only	None + on 8 examinations	103.2 to 105°F	104.2°F
One guinea-pig	8 days	Never + on 8 examinations	100.6 to 104°F	102.5°F
7 monkeys	Once only	3 times + on 7 examinations	101°F to 103.6°F	102.7°F
Monkey A	18 days	4 times + on 12 examinations	102.4 to 104.8°F	103.1°F
Monkey B	7 days	Never + on 4 examinations	102 to 103.2°F	102.5°F
13 rabbits	Once only	1 + on 13 examinations	103 to 105°F	104.2°F
Rabbit C	16 days	5 times + on 12 examinations	102.5 to 105.6°F	103.8°F
Rabbit D	18 days	3 times + on 13 examinations	103.2 to 104.8°F	103.9°F
*Rabbit E	16 days	Never + on 11 examinations	103.2 to 105.4°F	103.9°F
34 animals		16 times + on 88 examinations		

Note—\* Rabbit E inoculated with the blood of a case of filarial fever, inoculated febrile blood control. Vide also Table III.

The temperature chart of rabbit C is given in Chart IV as being typical of the whole series of non-inoculated animals. (This rabbit died, for some reason, on the 17th day of observation, but again a most thorough post mortem examination failed to shew the cause of death and no leptospira forms could be found in emulsions of the viscera.)

who had entirely escaped dengue in 1923 yielded the characteristic leptospira-like forms on the 15th day of culture. Of 7 non-inoculated monkeys 3 shewed the same form and a non-inoculated monkey, placed under daily observation for 18 days, shewed the same sort of temperature chart as did the inoculated monkeys and leptospira forms present on 4 out of 12 examinations. Of

13 non-inoculated control rabbits one showed leptospira forms, and 2 non-inoculated rabbits kept under observation for 16 and 18 days, respectively, both showed erratic but febrile temperature charts and leptospira forms on 8 out of 25 examinations (rabbits C and D). The 'organism' had been obtained in pure culture in Whittingham medium inoculated with the blood of a non-inoculated rabbit, and later the culture had appeared to die out. All attempts to obtain permanent stained preparations had again been negative, owing to the scantiness of the leptospira-like forms.

At this stage we passed through a set of experiments directed towards trying to concentrate the 'organisms,' taking positive human and animal bloods and positive cultures and taking the blood, and centrifuging and searching the deposit. These had negative results, in fact throughout the enquiry direct examination of the citrated blood or of the cultures under the dark ground yielded a greater percentage of positive findings than did any other method.

#### FINAL EXPERIMENTS

We next commenced to examine the tubes of Whittingham medium before inoculating them, as a still further control, and were amazed on the 20th of September to discover *exactly the same leptospira like forms as before* in a tube of culture medium taken straight from the incubator, prepared by the addition of rabbit blood on the 18th of September, but not inoculated with anything at all, 'tube 28' of the series.

These findings admitted of only four possible explanations—

(a) That the leptospira-like form was an artifact from the skin or fur of the animals under examination. The fact that it was found in blood obtained by venipuncture (in some instances) of human cases of dengue, that it was entirely absent from guinea-pig bloods and from all the control non-dengue human and guinea-pig bloods appeared to negative this. Monkey A (non-inoculated control), showed the typical forms present one morning on blood examination. It was immediately taken, its forearm shaved, cleansed with soap and water and sterilised in turn with alcohol ether and tincture of iodine. The needle, slides, cover slips and forceps used were all flamed. Three drops of its blood were taken without the addition of any citrated saline and examined direct. In all three the same forms were present in scanty numbers. Whatever the nature of the 'organism' seen, it undoubtedly came from the blood and not from extraneous sources.

(b) That we were dealing with a 'wild' leptospira which occurs in the blood of monkeys and rabbits, but not in that of guinea-pigs. The findings in the human cases negative this. Surely 'wild' leptospire do not inhabit the human blood in dengue, but not in health.

(c) That the control, as well as the experimental animals were themselves going down wholesale with dengue, as well as the human population around them. This appeared to be not impossible. The attendants on these animals, the sweepers, durwans and establishment at the School were going down wholesale with the disease. On the other hand why should guinea-pigs, which are usually held to be especially susceptible to leptospira infections, be so peculiarly immune? On this point we did our best to collect information, and a press communique was issued asking for information as to the possible incidence of dengue amongst the animal as well as amongst the human population. In one instance it was mentioned that a horse and two dogs belonging to a household where there were several cases of dengue had been ill at the same time as the human beings concerned but in general there was no definite evidence that there was any general epidemic among the animals in Calcutta. The volume of horse and bullock traffic in Calcutta city did not appear to be diminished. Cats were as prevalent and as active as ever at nights, especially in the Park Street area where 6 were caught at the height of the epidemic in a specially devised cat-trap and made over to the Pharmacology Department of the School for experimental purposes, whilst Dr Bradley, who is an enthusiastic volunteer

in the same cause, caught no less than 8 in one night at the Grand Hotel (6 of which were unfortunately rescued by lady residents at the hotel before he could smuggle them down to the School). Further the "positive" monkeys and rabbits did not show any joint swellings, no rashes were observed, and they did not appear to be suffering from joint pains to judge by the activity of their movements.

(d) That the leptospira-like form was an artifact of a peculiar and novel type, only present in the blood during febrile states. The whole trend of the evidence pointed in this direction, the presence of the form in febrile bloods and its absence from non-febrile bloods; its complete absence from guinea-pig bloods, where in our experience artifacts are rare, the erratic and alternating findings in 'positive' animals and cultures, both inoculated and non-inoculated, the pseudo-correlation of the form with the degree of fever present, the finding in stained preparations of forms with beaded ends similar to the leptospira-like forms seen under the dark ground, but not true leptospire at all, finally the finding of the same form in a non-inoculated tube of culture medium prepared with rabbit blood.

A set of experiments was therefore devised to test the validity of this last hypothesis. It was clearly useless to inoculate any human volunteers or experimental animals with the primary cultures, since in these the original dengue virus might easily have survived merely and not have multiplied. Also it seemed of little use to inoculate even subcultures into men or animals in Calcutta city, since, if dengue resulted and leptospira forms were found in the blood, one would not know whether the infection had resulted from the inoculation or had been acquired through natural channels. Certain experiments were, however, feasible, and they were as follows—

(1) Tubes of Whittingham medium were made with human blood from persons who were free from dengue in 1923, in place of preparation with rabbit blood. These are the tubes marked 'W H' in Table II, and they were inoculated with dengue bloods. Of 15 such tubes inoculated from 4 dengue cases 9 showed the same leptospira-like form again. The organism could not therefore be a 'wild' leptospira of monkeys and rabbits.

(2) Subcultures were taken from positive tubes into flasks of glucose broth and these were incubated, some aerobically and some anaerobically, at 37° C, to test the possibility of the form being a bacillus of aberrant type. No growth resulted.

(3) The junior writer having gone down with a severe attack of dengue during the enquiry was of no value as an experimental animal. The senior writer, however, seemed a suitable animal. His blood had been repeatedly examined with negative results. He had entirely escaped the disease. 'Tube 28' (non-inoculated tube prepared with rabbit blood) showed what was undoubtedly the same organism, whatever its true character. This might be the leptospira of dengue accidentally present and derived from the blood of the rabbit used in preparing the medium, or it might be an artifact. Half a c.c. of the culture was taken hypodermically by the senior writer at a time when dark ground examination showed it to be positive. Beyond a slight local reaction the next day, the result was completely negative, and not a single symptom of dengue manifested itself. Had the injection been followed by dengue the experiment would have been valueless under the local conditions present, but the completely negative result strengthens the case for regarding the form as an artifact.

(4) Three thick and four thin blood films were taken from cases of filarial fever and malaria, stained and searched for prolonged periods in the hope of finding the same forms in stained films from febrile bloods, but none could be found. Only from positive cultures could stained preparations be obtained and even then in extremely scanty numbers. Whatever the leptospira-like form is, it is exceedingly difficult to get stained preparations for study.



some inexplicable reason appeared to be febrile. Under such conditions it is likely that abnormal processes of erythrocyte degeneration should lead to the appearance of pseudo-spirochaetes of an unusual pattern. As J. G. Thomson (1923) points out, the supposed "leptospira" of blackwater fever is probably another instance of an artifact being mistaken for a spirochaete.

In conclusion we have to thank Major H. W. Acton, I.M.S., for constant advice, direction, and most helpful criticism. Step by step he studied our findings and the forms met with, and suggested the lines of enquiry to be pursued. Also our thanks are due to Lieut.-Colonel J. W. D. Megaw, I.M.S., for constant help and advice, to Dr. Shivapada Bhattacharjee, M.D. (Calcutta), for taking no end of trouble in securing suitable cases for investigation, and to Mr. Nag, photographer to the School, for the microphotographs.

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#### APPENDIX

##### I. On the Rectal Temperature of Experimental Animals in the Tropics

We have shewn that we regard the pseudo-organism described above as an artifact. The presence of an artifact cannot possibly cause an animal's temperature to become elevated, but, on the other hand, the injection of a foreign blood may cause a transitory reactionary fever. Hence we took all our temperature records, and from them deleted all readings taken within 24 hours of the inoculation of a foreign blood into the animals. The remaining observations are analysed in Table VIII.

TABLE VIII

##### Temperatures of Animals

Animals observed	Extreme range of temperatures	No. of observations	Mean of observations
Monkeys			
4 inoculated	100.2 to 106° F	72	102.7° F
No. 2 inoculated with culture	101.6 to 104° F	7	103.2° F
No. 4 passage	102.6 to 104.6° F	19	103.5° F
7 controls	101 to 103.6° F	7	102.7° F
Control A	102.4 to 104.8° F	12	103.1° F
Control B	102 to 103.2° F	4	102.5° F
Ditto, after inoculation with culture	102 to 104.2° F	8	103° F
Total 15 monkeys	101 to 106° F	129	102.9° F
Rabbits			
13 inoculated	102.4 to 107° F	126	103.7° F
No. 5, passage	102.4 to 104° F	14	103.4° F
No. 8, passage	102.6 to 104.6° F	17	103.6° F
No. 9, passage	102.8 to 107° F	13	104.2° F
13 controls	103 to 105° F	13	104.2° F
Control C	102.5 to 105.6° F	11	103.8° F
Control D	103.2 to 104.8° F	12	103.9° F
E, inoculated with filarial blood	103.2 to 105.4° F	11	103.8° F
Ditto, after inoculation with culture	103.4 to 106.6° F	7	105.2° F
Total 32 rabbits	102.4 to 107° F	224	103.7° F
Guinea-Pigs			
3 inoculated	102 to 104° F	27	102.7° F
8 controls	103.2 to 105° F	8	104.2° F
1 control	100.6 to 104° F	7	102.5° F
Total 12 guinea-pigs	100.6 to 105° F	42	103° F



It will be seen that our readings are at a definitely higher level than those given by Archibald (*loc cit*) The figures run as follows —

Rhesus monkeys	Extremes 94.8 to 104°F	Mean 101.1°F
	(Archibald)	
	Extremes, 101 to 106°F	Mean 102.9°F
	(our observations)	
Rabbits	Extremes, 99.1 to 103.8°F	Mean 102.6°F
	(Archibald)	
	Extremes 102.4 to 107°F	Mean 103.7°F (our readings)
Guinea pigs	Extremes, 101.3 to 102.9°F	Mean 101.7°F
	(Archibald)	
	Extremes, 100.6 to 105°F	Mean 103°F (our readings)

We have been puzzled throughout the enquiry how to account for this finding. We believe that the thermometers which we used were reliable. In each reading the thermometer was held in place for two minutes as timed by a stop watch. Four thermometers were used at different times but all gave similar readings. We have shown that we do not believe that epidemic dengue among the animals explains these readings. It is just possible, however, that during August and September, the two months of the year of most intense damp heat in Calcutta, the temperature of such animals *might* be somewhat higher than at other seasons or the year or in colder climates. Their heat regulating mechanism is presumably not quite so well balanced as that of man. On no less than 18 occasions rabbits apparently in the best of health and vigour gave rectal readings of between 106 and 107°F (Table VI). More information on the subject is badly wanted, and its importance to laboratory workers in the tropics is obvious. We hope to place groups of healthy animals under daily observations over prolonged periods as soon as the newly built animal house at the School is ready, and to analyse the results at a future date. In the meantime we publish Table VIII mainly to draw attention to the matter.

## II On the Puzzles and Fallacies of Dark Ground Examination of the Blood

No one can spend weeks and months together, as we have recently done, on an intensive study of bloods by dark ground examination without gaining a fairly detailed knowledge of this subject. We have not had access to the *Folia Hæmatologica* but there are two excellent accounts in English of the pseudo-spirochetes and other artifacts encountered in the connection, the best being the classical paper by Dr Andrew Balfour on blood examination (Balfour 1911), and the other being the paper by Dr Helen Chambers (1913) already referred to. As the subject is however, of great importance to laboratory workers we may perhaps be permitted to discuss it here. Figure 6 on p. 13 illustrates the forms most frequently encountered, it is drawn from a collection of sketches and rough notes and drawings made during the course of this enquiry. We believe that such artifacts are much more common in febrile than in afebrile bloods. It is well known that the hæmoconia particles are most conspicuous shortly after a meal when the lipid content of the blood is raised as a result of the processes of digestion. Also such artifacts tend to increase with the interval of time that elapses between the shedding and the examination of the blood. Further they appear to be much more common near the vaselined edge of the preparation where osmotic forces are in play, than in the centre.

An excellent way to study such artifacts is to take blood, defibrinate it and then "cook" it for two to three hours on a water bath at a febrile temperature, 106 to 111°F, and withdraw half hourly samples with a sterile capillary pipette for examination under the dark ground. The unheated blood of guinea-pigs appears to be singularly free from such artifacts, whereas they seem to be more numerous in the blood of rabbits and of rhesus monkeys than in that of man. It is important to note that pseudo-spirochetes in very scanty numbers may

be encountered within a minute or two of taking the blood and in perfectly fresh material.

We would classify the commoner forms encountered as follows —

(1) *The ultra-particle* — The higher the magnification of the ocular used, the more of these that are discovered. They are tiny, ultra-micro particles close upon the limits of visibility, and show Brownian movement. They are *not* refringent, but dull. If certain of the filtrable viruses be due to organisms of the micro-micro-organism type described by Lieutenant-Colonel H. M. Gordon, R.A.M.C., as the virus of pandemic influenza, then we do not envy the research workers who attempt to observe them under the dark ground, because the ultra-particles will constitute a very great difficulty. In 1922 in conjunction with Major Acton, R.A.M.C., we spent weeks trying to discover the micro-organism of rabies in the brains of fixed virus rabbits, but were compelled to temporarily abandon the enquiry because the artifacts in an emulsion of brain tissue whether examined in fresh or in stained preparations, are so numerous that they almost prohibit the discovery of any ultra-micro living organism.

(2) *The hæmoconia particles or blood-dust* (Figure 6 a) — These are seen in all or almost all preparations. The particle is about half a micron in diameter, often oval rather than round, and these particles occur either singly, frequently in pairs when they show a dumb-bell shape, more rarely in chains of three. They show vigorous Brownian movement. They can always be identified with certainty by one feature from time to time as they oscillate in the fluid they suddenly catch the light and become for an instant brilliantly refringent, the beam of light resembling the sudden beacon flash from a light-house when seen at sea. These particles may be of lipid origin.

(3) *The straight, non-motile streamer* (Figure 6 b) — This is a straight, non-motile, spike-like process originating from the red corpuscles and more frequently from the blood platelets. We have never seen this streamer detached and it could deceive no careful worker. We have recently, however, had submitted to us stained blood films "showing curious minute flagellate organisms." These were platelets showing streamers. The straight streamer is *not* refringent and it is often seen in stained films.

(4) *The chain streamer* (Figure 6 c) — These are not infrequent and they are well figured by Balfour. The red corpuscle, during its degeneration, appears to be producing bud after bud, each with its own independent limiting membrane, until a long chain-like form results, swaying in the fluid. We have also seen these chains detached and lying free in the plasma. They are *not* refringent and may simulate yeasts. To what extent true yeasts (cryptococci) are present in the blood of animals from time to time we have not yet determined, but we are convinced that they are not infrequent and that they constitute a special difficulty to workers on *Leishmania* infections in experimental animals.

(5) *The pessary body* (Figure 6 d) — This probably represents the remains of a distorted or fragmented erythrocyte. Typically it is narrow in the middle and clubbed, ovoid or enlarged at both ends. It shows a well defined limiting membrane and a dull body. The shape may vary from a big bacillus-like form to a dumb-bell type, but it has one diagnostic feature. From time to time as it oscillates in the fluid it suddenly catches the light and becomes for a moment brilliantly refringent, as does the hæmoconia particle. There is the same beacon-like flash about it.

(6) *The multiple streamers* (Figure 6 e) — Very frequently a degenerating red corpuscle is seen to be giving off simultaneously from 6 to 10 small, fine streamers. Pores appear to form in the erythrocyte membrane and from them the cytoplasm of the cell protrudes in the form of thin, pseudo-motile streamers, usually short and never, we believe, when multiple much

## THE TREATMENT OF SYPHILIS BY "BISMUTH"

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THE original papers on this subject were contributed in 1921 by Sazerac and Levaditi (1)

In 1923 Levaditi (2) contributed an article in English, in which he justly puts forward the claims for the use of bismuth. He shows healing by cicatrization of the lesions in all stages of syphilis. He is sure that it is equal in efficacy to arsenical preparations and better than mercury, and claims a superiority over arsenic in those cases which are resistant to arsenic and mercury. It is also shown experimentally in rabbits and in acquired syphilis in man that bismuth possesses a powerful curative action. Fournier and Guenot (3) used this remedy in a large number of cases with good results. Professor Block (4) made use of it in the Dermatological Clinic of Zurich and found that the most suitable preparation of bismuth was "Neo-Trepol."

This treatment undoubtedly has a very rapid effect upon all three stages of syphilis. The primary sore loses its induration and heals very quickly. The secondary lesions—rashes, condylomata and mucous patches—vanish. In the tertiary stage the arthritis, the gummata and perforation of the palate show improvement and gradually disappear. The gummata gradually become clean and heal. Professor Block does not place much confidence in the bismuth treatment for cases of tabes, but one case of tabes which I had under treatment quickly showed a change after completing a course of eleven injections. The patient's husband having been transferred, I have now lost sight of the case.

The following notes of a few interesting cases will illustrate the clinical course of treatment with bismuth—

1 Patient aged 25, English. Primary sore on glans penis, spirochaetes present. Trepol was used. After the 4th injection spirochaetes were absent and the papulopurulent chancre showed signs of skinning over. After the 6th injection the swelling of the epitrochlear glands disappeared and the Wassermann reaction was negative after 12 injections.

2 Patient aged 37, Scotch. Primary sore on penis, condylomata; spirochaetes present. Trepol used. After the 3rd injection no spirochaetes were found. The condylomata showed signs of eradication. The Wassermann reaction before treatment was ++++. After eight injections it became doubtful and negative after 14 injections.

3 Patient aged 45, Parsi. Arthritic pains. History of syphilis 15 years previously. Two 606 injections 10 years ago. No other sign or symptoms. Wassermann ++. After four injections the pains disappeared. The Wassermann reaction was doubtful after 10 injections.

4 Patient aged 29, English female. Rash and condylomata, Wassermann + + +, sore throat, Herxheimer's sign present, Neo-Trepol used. After the third injection the rash disappeared, after the fifth injection all symptoms were lost. The Wassermann reaction remained doubtful even after 12 injections.

5 Patient aged 18, Hindu. Hutchinson's teeth, perforation of the palate, nodes on tibia. No marked improvement until the seventh injection when the patient could gargle his mouth without water entering the nose. The perforated part was still weak and had not completely healed. The headaches disappeared after the third injection. The nodes disappeared after 16 injections.

6 Patient aged 31, Hindu. Tongue swollen, fissured and pulpy, could not roll or move it. Speech affected. After 4 injections the speech became clearer and the tongue less pulpy. After 10 injections all trouble disappeared and the speech was perfect.

7 Patient aged 46, Mohamedan, with a gumma about 3 inches in diameter on the right leg, serpiginous with edges indurated. History of syphilis 20 years before. Was treated 10 years ago with 606, 2 injections. After 6 injections of Neo-Trepol the slough disappeared, the margins healed and the ulcer showed signs of skinning over. After 10 injections the ulcer healed with hardly any scar.

8 Patient aged 30, Hindu female. Tabes present. After 5 injections the gastric crisis and lightning pains disappeared, after 12 injections all signs disappeared, but the headaches still persisted although not as severe as before. The patient left me as her husband was transferred.

9 Patient aged 33, Mohamedan. Had a chancre 8 years before, treated with 606, two injections, and three NAB injections. In all 5 injections. Developed gastric trouble, was fast running down. On examination I found the stomach dilated and the liver enlarged. The epitrochlear glands could be easily felt, as big as hazelnut. Nervous breakdown, iritis present. 18 injections of Neo-Trepol were given. Patient doing well. Wassermann reaction doubtful.

Thus it will be seen that there is an immediate improvement in clinical symptoms under bismuth treatment, but as regards the serological reaction of the blood I have had no opportunities to try further and to give an opinion. Levaditi (5) in 1922, has shown its serological effect. I believe there is not much to choose between arsenic and bismuth with regard to serological results. The clinical and bacteriological effects are as strong and are at any rate not inferior to those with arsenic, but when we compare these drugs as regards tolerance we find that bismuth, although toxic, does not exert such a toxic action as does arsenic. In its toxic action bismuth resembles the insoluble salts of mercury in producing lesions of the mouth, intestines, stomach, and kidneys. The commonest ill-effect of the bismuth preparation is the appearance of a bismuth line on the gums and if treatment is not then checked it produces stomatitis and eventually ulceration. This bismuth line is caused by a deposit of sulphide of bismuth in the cells of the connective tissue of the mucosa and also in the endothelium of the vessels. In the literature mention is made of bismuth poisoning, (6) Wolfer mentions cases in which nephritis has developed. This, though rare, is transient and hardly necessitates stoppage of treatment. According to Wolfer, mercury is

much more toxic than bismuth. Both are capable of being stored up in the muscles for a time but bismuth is the more easily absorbed of the two. Levaditi says that bismuth injections are equal to arsenic and better than mercury and are especially applicable to cases resistant to arsenic and mercury. Escher (7) and other observers (8) are also of the same opinion. Some authors such as Emery and Morin (9) are of opinion that a combination of bismuth and arsenic, with mercury as an accessory, is the best line of treatment for syphilis.

Many varieties of bismuth preparations are on the market including single and double salts, organic compounds, colloids of bismuth and the metal itself in fine state of division —

(a) Trepol = tartro-bismuthate of potassium and containing 64 per cent of bismuth.

(b) Neo-Trepol = precipitated bismuth in an isotonic medium containing 96 per cent of bismuth.

(c) Oleo-Bi (Roche) (10) = a fine suspension in oil of bismuth oleate.

(d) Quinio-bismuth = an iodine bismuth compound of quinine.

I have used Trepol and Neo-Trepol, and, as shown above, have obtained better results with the latter. As regards poisoning it is easily managed and rarely met with. In one case I pushed the treatment to as much as 4 c.c. per injection without any signs of poisoning. In cases of acute poisoning I found temporary stoppage of treatment, with injection of intramine, and potassium chlorate mixture by mouth very helpful.

To sum up, there is no doubt that its clinical and bacteriological effects are excellent but as regards its serological side I am not in a position to give a verdict as most of my cases were treated in the district, but the others where the blood was examined (10 per cent) gave a decided change in the Wassermann reaction. I believe bismuth to be in no sense inferior to arsenic and there is no doubt that it is superior to mercury as an anti-syphilitic remedy. I believe bismuth is probably destined to replace arsenic in time, anyhow its great advantage is that it is painless, easily administered, not at all dangerous, and if not more effective, it is at least as effective as arsenic.

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## A Mirror of Hospital Practice.

### A CASE OF PANCREATIC CYST IN A CHILD

By A. K. RAGHAVAN, M.B., B.S.,  
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As this condition is extremely rare in children and is likely to be overlooked, a short account of a case may be of some interest.

Parameswaran, a Nair boy, aged 3½ years, was admitted on July 21st, 1923, into Rao Bahadur Dr. Krishnan's Hospital, Palghat, with a distended abdomen, severe constipation and occasional vomiting. Before admission to hospital the child had been treated for a few days as an outpatient of the local Municipal Hospital for worms with no improvement.

The swelling was first noticed by the mother two months previously, and she said that it had gradually increased in size ever since. Constipation and vomiting began five days before admission. There was no history of fever or trauma. The urine passed was always normal in quantity. It was rather strange to find that the child, even though 3½ years old, was still breast-fed.

The child was weak and emaciated, the abdomen markedly distended, breathing difficult, temperature normal, pulse rapid and feeble, urine normal, temper very irritable.

The swelling in the abdomen was seen to be most marked above the umbilicus. On palpation a definite round tumour was felt in the middle of the abdomen in the epigastric and umbilical regions. The tumour was fixed and did not move on respiration. There was distinct dullness on percussion over the tumour, the area surrounding it was tympanitic. A fluid thrill could be elicited to a certain extent.

To relieve constipation the child was given drachm doses of paroline by the mouth up to one ounce, and glycerine enemata at first, and soap and water enemata later per rectum with fairly good results. Vomiting became more frequent and troublesome, however, and the child was getting weaker.

As the pressure symptoms were getting very marked it was decided not to delay the operation. So, on the following day the child was prepared for operation and put on the table. As the tumour was situated centrally I made an incision in the median line of the abdomen starting two inches below the xiphoid process and extending an inch and a half below the umbilicus. On opening the abdomen I found a greyish white cyst lying between the stomach above and the transverse colon below. The cyst wall was incised for an inch and about 3 pints of black coffee coloured fluid let out. On exploring the cavity with the index finger I found the cyst

fixed to the posterior abdominal wall. A drainage tube was put in, the cyst wall sutured to the parietal peritoneum and the abdomen closed.

After the operation vomiting ceased and the bowels moved freely. The child was fed on cow's milk and rice water in addition to the mother's milk.

As there was no discharge from the cavity the drainage tube was removed on the 4th day and a simple gauze drain substituted. The sutures were removed on the 8th day. The sinus completely healed up and the child was discharged cured on August 20th, 1923.

### A CASE OF LYMPHATIC CYST OR HYDROCELE OF THE NECK

By A. K. RAGHAVAN, M.B., B.S.,  
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ABDUL RAZAK, a Mohamadan male child, aged one year and nine months, was admitted into Rao Bahadur K. Krishnan's Hospital and Nursing Home, Palghat, on 29th August, 1923, for a swelling in the neck. The child was brought by the parents with some reluctance, as a local surgeon whom they had consulted a few days before pronounced the case as inoperable.



*History of Present Illness*—A red linear mark about an inch in length was noticed at birth on the right side of the neck an inch and a half below the lobe of the right ear. Some time later a swelling appeared in the same region which gradually increased in size until it assumed its present form. There was no pain at any time, the only inconvenience being a mechanical one in moving the head to the

right and in lifting up the right arm, due to the size and location of the tumour. A fortnight before admission the child was taken to an Ayurvedic physician for treatment. He branded the skin at the centre of the tumour, which not only failed to arrest its growth but produced a painful ulcer. This treatment is invariably and relentlessly tried by this class of physicians as a last resort in all kinds of tumours.

*Condition on admission*—The child is fairly well nourished. A smooth tense tumour more or less elliptical is situated on the right side of the neck extending transversely from the median line of the neck to  $\frac{3}{4}$  inch short of the posterior median line. The diameters are  $7\frac{1}{2}$  inches transversely and  $3\frac{1}{2}$  inches vertically. The tumour presents a bilobed appearance, the sterno-mastoid muscle passing over it in the middle. The ulcer, a little bigger than a half anna piece, is situated about the centre of the tumour. The tumour is not fixed. Fluctuation present. Temperature and pulse normal. No blood changes. Urine normal. Diagnosed as a case of hydrocele of the neck and posted for operation.

On 26th September the cyst was excised under chloroform. Two semilunar incisions were made transversely to exclude the area of ulcer from the field of operation. The cyst was separated from its capsule on all sides except at its base. As its removal intact was impossible without dividing the sterno-mastoid, a puncture was made posteriorly on the wall of the cyst and the fluid let out, the fluid being yellow and serous like that of an ordinary hydrocele. The posterior part of the cyst was then separated from its base and brought anteriorly underneath the sterno-mastoid. The whole cyst was separated out from its remaining attachment and removed completely. Anteriorly the cyst was adherent to the internal jugular vein from which it had to be dissected out most carefully. The contents of the carotid sheath were exposed on removal of the cyst and they were found rather widely spread.

The child had an uneventful recovery except for a small sinus in the posterior part of the incision which had to be dressed every day for a fortnight.

### A CYSTIC TUMOUR OF THE OMENTUM

By BHAGWAN DAS, L.M. & S.,  
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A HINDU boy, Fu'aram, aged about 12, was admitted for the treatment of a prominent swelling in the abdomen which was painless and unaccompanied by any other symptoms. Duration five months.

*History of Previous Illness*—Nothing particular.

*Family History*—Both parents died of some continuous fever. One brother aged 30 years

and a sister aged 15 are healthy No history of hereditary disease in the family

*History of Present Illness*—Five months ago the boy suffered from some slight pain in the right part of abdomen for about a week, after which a swelling began to appear in the right and upper part of his abdomen. It rapidly increased during the first month, and then gradually until it had acquired the present size. There were no other complaints, except a feeling of distension and a little loss of appetite.

*Local Condition*—A tumour present of about the size of a melon, occupying almost all the upper part of the abdomen and reaching as far below as the umbilicus. It was freely movable in the abdomen and the overlying skin was not adherent to it. It was dull to percussion but this dullness was not continuous with the area of liver dullness. Liver and spleen not palpable below the costal margins. There was no distension of the superficial abdominal veins, no jaundice and no swelling of the feet or anasarca. The patient was slightly anæmic and on examination of his urine was found to pass albumen in abundance.

*Diagnosis*—Cystic tumour (probably hydatid cyst of the liver) was diagnosed and the boy was prepared for laparotomy in the usual way.

On opening the abdomen the tumour presented itself in the abdominal opening. It was adherent to the omentum in front and firmly adherent to the mesentery and to the upper part of the jejunum behind. After cautiously separating the adhesions the tumour was removed. It had a thick sac and contained dirty looking greenish fluid. The intestines being firmly adherent, I had to separate the adhesions from the side of the tumour with the result that the friable wall gave way and a little fluid entered the abdominal cavity. The cavity was flushed with hot saline. There was practically no bleeding during operation and the wound was stitched up. The patient had a rise of temperature for the first two days after operation, and the morning after operation he vomited two or three times and some peritonitis was suspected. But on the third day the temperature came down to normal and he had no other trouble. On the twelfth day all the stitches were removed and the wound was found to have healed soundly by first intention. The boy was discharged cured from hospital.

This condition is, I believe, a rare one

## TWO SURGICAL CASES

By K. S. RANGANATHAN, L.M.P.,  
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*I. A case of Vesical calculus with bilateral Hydrocephrosis*—Patient T, a young boy of about 12 years, was admitted to this hospital

on 9th August, 1923, for dribbling of urine and pain in the penis. Duration of illness—1½ years.

His bladder was sounded under chloroform and a vesical calculus diagnosed. He was posted for operation on 13th August, 1923, was given a mixture of urotropine and acid sodium phosphate and his bladder washed twice daily with warm boric lotion. On the same evening he had a rise of temperature to 100°F and complained of increased pain. Pulse 104 per minute, respiration 28 per minute. The fever was thought to be result of the sounding and he was given Mist Quinine (grs ten to one ounce).

Tenth morning—Temperature normal, but he still complained of great pain in the supra-pubic region. There was dribbling of blood-stained urine. Patient very irritable and refused diet.

Tenth morning—Temperature normal, but Urine still blood-stained. Bladder not washed out as patient was very unwilling.

Eleventh morning—Patient restless. Twitching of the muscles of the face. Got fits at 8 a.m. which lasted for half-an-hour. Became slightly comatose at 10 a.m.

Mag sulph 6 drachms given at once in two ounces of water. Subcutaneously 10 ounces of sodi bicarb solution (grs 60 to the pint).

Hot fomentations ordered for the loins and a rectal injection of 5 per cent glucose in normal saline solution given.

Twelve noon—Patient deeply comatose. Temperature sub-normal 97.8°F. Respiration 34 per minute and laboured in character.

Six p.m.—Deeply comatose. Pulse 110 per minute, soft and small. Respirations hurried and shallow. Moist crepitations in the bases of both lungs. An injection of strychnine and digitalin given and glucose in saline repeated rectally.

Twelfth morning—Temperature sub-normal 97.8°F. Pulse imperceptible at the wrist. Did not improve even after a saline infusion. Patient bathed in profuse perspiration. He died at 9 a.m.

*Post-mortem notes*—Bladder enlarged and hypertrophied. Section showed congestion of the bladder wall, which was about an inch in thickness. In the cavity of the bladder was a kidney-shaped stone, pale brown in colour. It weighed one ounce and forty grains and measured 1½" × 1" × 1". Its surface was very rough and tuberculated.

The ureters were thickened and very much dilated throughout their length—large enough to admit the thumb, tortuous and pouched in some places with a close network of blood vessels on the outer surface. Their inner surface was dark in colour.

*Kidneys*—Left. Looked large and felt like a bag containing some fluid. Measured about 6" from pole to pole and 4" at the hilum. On section pelvis dilated to about the size of a

lime, calyces expanded into cavities containing clear urine. Renal substance completely atrophied. Cortex thinned out and only about an eighth of an inch in thickness.

*Right*—Adherent to the surrounding tissues. Enlarged and heavy. Measured 5" × 3½" × 3". On section pelvis dilated, renal tissue hypertrophied and congested, calyces expanded into small cavities and distended with urine.

Other organs normal.

Bilateral hydronephrosis is caused by obstruction at the neck of the bladder or in the urethra. It is not the immediate result of the back pressure on the kidneys, because the cavities of the bladder and ureters are not directly continuous, their orifices being valvular. But it is indirectly due to the compression of the ureters as they pass obliquely through the hypertrophied and indurated bladder wall.

Perhaps the roughness of the stone and not its size is the more important factor in causing the hypertrophy. For if it were not so, what would be the condition of the kidneys in cases of stone which require removal by midwifery forceps?

*II A case of primary cancer of the liver*—Patient N, a cooly, aged about 55 years, sought admission to this hospital on 16th August, 1923, for a painful swelling in the right side of his abdomen. Duration of illness two months.

*History of present condition*—Two months ago the patient felt some breathlessness, especially after a full meal, and he had to lessen the quantity of food to avoid it. About two weeks later he noticed a small swelling in the right side of his abdomen. It was at first painless but became painful ten days later. The pain grew worse as the swelling increased in size.

*Previous history*—He gave a history of gonorrhœa, but none of dysentery, syphilis or alcohol.

*Condition on admission*—Patient fairly well nourished, slightly anæmic. Abdomen distended in its upper part. There was a tumour of the size of an orange in the right hypochondriac area about 1" below the costal margin, hard, tender to the touch, with the skin over it tense and shiny. Not movable, but moved slightly with respiration. Dull on percussion, the dullness being continuous above with that of the liver. Lower limit of dullness four finger breadths below costal margin.

Stools—No amœbæ found.

Blood—Wassermann reaction strongly positive.

Differential leucocyte count—

Polymorphonuclears	57 per cent
Large mononuclears	7 "
Lymphocytes	31 "
Eosinophils	5 "

Urine—Specific gravity, 1020

Acid reaction

No albumen

No sugar

*Diagnosis*—Was between malignant growth and syphilitic disease of liver, other conditions such as hydatid cyst, amœbic abscess, etc., having been eliminated. The positive Wassermann reaction was in favour of syphilis and indicated a trial with anti-syphilitic treatment.

The patient was put on potass iodide grs 10 t i d on 19th August, 1923. On the 22nd the patient complained of unbearable pain and the swelling had also considerably increased in size since admission. An exploratory laparotomy was done on 23rd August, 1923. The parietal peritoneum was found adherent to the liver. The liver was very much enlarged, its lower margin extending to a little above the umbilicus. Blood stained fluid welled up through the wound. The surface of the liver was nodular. The lower portion of the right lobe was soft and gave the feel of a cyst. It was diagnosed as cancer and the abdomen was closed. Thereafter there was constant oozing of blood stained fluid into the dressings requiring their renewal frequently. The patient died at 5 a.m. on 27th August 1923.

On post-mortem the right lobe of the liver was found enlarged to nearly twice its normal size. It was adherent all over and could only be removed with difficulty. Surface nodular. Section—cuts with resistance, is greyish white in colour. The lower part of the right lobe breaking down. A careful search was made for a primary focus, but none could be found. A section was sent to the pathologist and the following is his report.

"The peri-portal connective tissue is much increased in the direction of peri-portal cirrhosis. Large areas of section are necrotic and granular. Liver trabeculae are replaced by epithelial cells probably arising from liver cells themselves. They show darkly stained nuclei, eosinophile protoplasm and other evidence of recent formation. The section is one of carcinoma of the liver and has features of a type of primary cancer of that organ."

Interesting features in this case are—

1 The rapid course of the disease. It killed the patient within a period of ten weeks.

2 The absence of jaundice.

3 The positive Wassermann reaction.

4 The absence of a history of alcohol. Cirrhosis of the liver is believed to bear some relationship to cancer of that organ, as does chronic mastitis to cancer of the breast.

5 The absence of a history of dysentery. Dysentery, particularly the bacillary form, is believed by some to be the cause of a type of interstitial hepatitis, which may, like cirrhosis, predispose to hepatic cancer.

In conclusion, I have to thank Dr H. S. Hensman, M.R.C.S., L.R.C.P., for kindly permitting the publication of the above cases.

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**Chlorosis**

**Dyspeptic Anorexia**

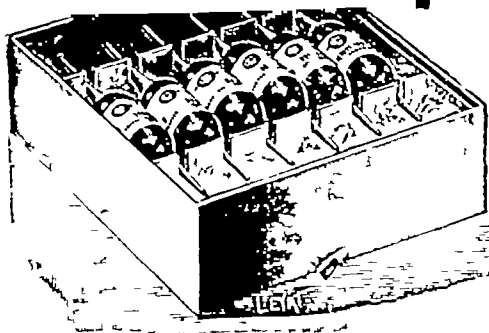
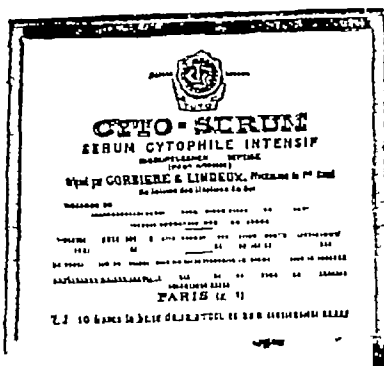
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**Tuberculosis**

**Depressed States of the nervous system**

**General Debility**

**All Atonic Cases**



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'A case of pulmonary tuberculosis has had 8 ampoules of Cyto-Serum in 5 weeks, and in that time has gained 7 lbs in weight as compared with 5 lbs in 8 weeks with tonics malt and oil etc

Yours faithfully  
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By W W JEUDWINE,  
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On four occasions he coughed up small hard particles of calcified material which were probably the remains of a calcified gland Tubercle bacilli were once found in small numbers in his sputum

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His weight gradually increased from 6 st 12 lbs to 7 st 12 lbs while he was in hospital and it increased to 9 st 2 lbs before he left Delhi in March He was fat all over His physical signs in the lungs cleared up partly

He had a slight rise of temperature when he started the intramuscular injection of Cyto Serum and Hæmo-Cyto-Serum but his improvement was maintained If this was a case of pure tubercle the result obtained is all the more unexpected

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Arsenio - Chlorhydrate of Quinine	0.30 „
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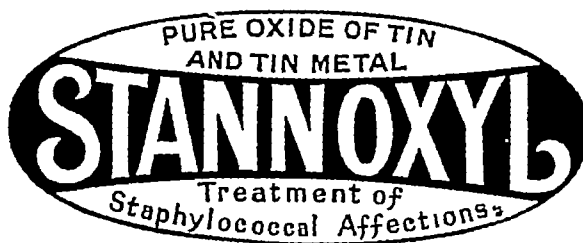
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For adults in acute cases, one injection daily, or two if necessary. In chronic cases, one injection every other day according to the discretion of the physician

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# Indian Medical Gazette.

JANUARY

## THE NEXT STEP?

SIR GEORGE NEWMAN, Chief Medical Officer of the Ministry of Health of the United Kingdom, is able to point with justifiable pride to the solid achievements of preventive medicine in England

During the past 30 years the yearly death rate from typhoid fever has fallen from 229 per million to 12 per million, small-pox deaths have fallen to 14 per million, tuberculosis from 3,189 in 1847 to 854 per million, and the infant mortality in great industrial centres to a fraction of what it used to be

But there is another side to the picture, he finds that non-tuberculous diseases are responsible for 18 per cent of all the deaths in Great Britain, diseases of the heart and circulation for 16 per cent, cancer for 10 per cent, and consumption for 9 per cent, he asks what preventive medicine has to say to these figures. His solution lies in the permeation of the medical curriculum with the spirit and methods of disease prevention by a special course of instruction in preventive medicine and by special attention to the preventive aspect of clinical work. He suggests that when a patient comes for treatment the question should always be asked "Why is this patient here?", so that when the medical man comes to the practice of his profession he may get into the habit of asking himself "What can I do to prevent this?"

The true spirit and ideals of medicine could not be better expressed, and we in India need to catch this spirit and these ideals. It is true that we have not yet taken the first step which has been taken in England and America, we are still struggling with diseases like cholera and plague and leprosy and relapsing fever which have been banished in other countries by the adoption of a moderate standard of sanitation, and the greatness of the task which lies before us has perhaps created in us a sense of our helplessness in the presence of the problem of disease prevention

In India as elsewhere the greatest pecuniary rewards are for those who try to patch up the damage already done by disease to the individual, while those whose business lies in prevention, whether by research or by public health activities, are the hewers of wood and the drawers of water of the profession. The question for us is, wherein lies the remedy? There is one thing that the doctor can do in India, he can prove the

sincerity of the noble professions which are made by medical men by taking up his share of the burden of preventive medicine, he can regard himself not merely as the paid servant of the patients whom he relieves, but also as the unpaid missionary of disease prevention. He can explain to his patients how they came to fall into the hands of doctors and how best they can avoid this unpleasant experience in future. If only every doctor were to follow this course, a knowledge of disease prevention would gradually extend among their patients and from them to the masses of the population. The fatalistic view of disease would gradually be replaced by the view that most diseases are the result of wrong living, of failure to adapt ourselves to our environment, and to adapt our environment to ourselves. The mere fact that we have so much leeway to make up as compared with more advanced countries is not a reason for inaction, it should be a stimulus to greater activity on our part. Every doctor all over the land should be a public health worker and an investigator. He should regard it as a disgrace to the medical profession that so much preventable disease is allowed to exist and that so little is being done to prevent it. Even if the work be unpaid, it will yield him a great dividend in giving him a fresh interest in his profession and in the higher satisfaction which comes from work done for the common good rather than for pay.

It is even likely that such activity will not be opposed to his personal advantage. The doctor who shows that he is interested in his patient's welfare apart from the immediate duty of repairing the damage which he is called in to attend to, will certainly obtain the recognition of the community and this will take the tangible form of increasing popularity both socially and professionally. The solution of the outstanding problems of medicine will be attained much more quickly if every clinician does only a little as an observer of the conditions under which certain diseases appear, the combined observations of thousands of doctors all over India will be of immense help in clearing up the unsolved problems. There is another aspect of the question which has not been sufficiently grasped even by the medical profession of England, we do not make half enough use of the knowledge which we already possess. Let us note a few examples of this.

It is notorious that respiratory infections have not yielded to modern sanitation to any great extent the reason appears to be that while we talk glibly enough about droplet infection we go on acting as if such a thing did not exist. We know about alimentary canal infections and every educated person is careful of his water supply and of the cleanliness

of his food, the result is a great reduction in alimentary infections in all advanced countries. It is not so with respiratory infections, we know of their existence but do not hesitate to inhale the air which is being filled with myriads of microbes by a patient who suffers from influenza or the hundred and one other kinds of respiratory infection. It has become the fashion to drink pure water but it has not yet become the fashion to inhale pure air, and until the doctors themselves introduce the cult of clean air we cannot expect to see any great diminution in respiratory diseases. Quite recently we called attention to the necessity for tackling rheumatic endocarditis at its very source, and there is little doubt that this disease could be abolished with many others by avoiding droplet infection of all kinds.

A long list might be made of diseases which would come under complete or partial control if we adopted the fashion of breathing uninfected air: measles, whooping cough, tonsillitis, diphtheria, bronchitis, influenza, acute rheumatism, pneumonia and to large extent tuberculosis itself would promptly cease to hold sway if we refused to inhale germs. In India it would be easy for us to take this matter in hand: we have not the same difficulties to contend against as those who live in cold and damp climates where open air life is unpleasant for a great part of the year.

It may take a long time to rub in the lesson of clean air and of keeping the people who cough and sneeze in their proper place, which is in the open air where they are better off and cannot harm their fellows. One would have thought that the great influenza pandemic would have given the necessary impetus to the pure air cult, but apparently the world is not yet ripe for the new doctrine, perhaps the next great epidemic will compel our attention at a cost of some millions of lives. The penalty for neglect of observation and failure to apply the results of our observations is a very grim one, and nature will go on steadily exacting the toll until we take action. In the case of most diseases we are merely suffering the due punishment of our sins, and if the enormity of our misdeeds is to be estimated by the penalty which we have to pay, it must be great indeed.

In connection with droplet infection two lines of research remain to be followed out by investigators, one is to determine the range of bombardment of the various droplet infections, and the width of the air barrier which will suffice to protect against droplet infection under varying conditions, the other is to devise some means of getting rid of the infection which is carried by most of us in our upper air passages. A disinfectant gas or spray which will render the respiratory

mucosa aseptic without causing undue irritation will be of enormous value to the world.

Reference has also been made recently in this journal to the avoidance of cancer. At last the experts are convinced not only of the part played by chronic irritation in its various forms in the causation of cancer, they even suggest in a half hearted and apologetic manner that it is desirable to avoid certain forms of irritation which are known to predispose to cancer, they still however lay great stress on the fact that the causation of cancer is a mystery, as if the causation of life itself were not a mystery. What the man in the street wants to know about cancer is how to avoid it, we know a great deal about this, but for some mysterious reason we hesitate to act upon our knowledge.

In these two matters of respiratory infection and cancer there is a curious mental kink which prevents us from taking the next step. It would be interesting if we could read what the medical writers of fifty years hence will have to say about us. They will certainly be greatly puzzled to account for our obstinate refusal to realize the possibility of making use of the knowledge which we have already acquired.

#### PALEOPATHOLOGY

MEDICINE is fortunately something more than an art, it is also a progressive science with an ever widening horizon of interest. And there has recently come to hand a book which is so exceptional and of such interest that it perhaps claims attention in our editorial, rather than in our review columns.

Paleopathology is the latest, but almost the most fascinating of medical sciences. The science dates from 1774 when Esper of Erlangen described what he considered to be an osteosarcoma in a cave bear of the Pleistocene period. Since then many distinguished anatomists and pathologists have paid some scanty attention to the subject, notably Cuvier, Owen, Mayer, Leidy, Virchow, Elliott-Smith, Keith, Shattock, Klebs and others. But the observations of these distinguished authors are scanty and scattered, and it has remained for Dr Roy L. Moodie, Associate Professor of Anatomy in the University of Illinois, who has for many years been studying the subject to now collect and co-ordinate our knowledge of the relatively new science into one single and intensely interesting volume\*. Dr Moodie's most valuable work is one of the very best expositions of American medicine that we have seen, it is beautifully got up and edited, is illustrated with a wealth of full page plates and etchings, includes a full bibliography and a complete index, and forms a fully detailed and intensely interesting exposition of our knowledge of the diseases of plants, animals and man from the first origins of life down to 600 A.D. The volume is one which it is almost impossible to summarise: it is probably one which will appeal chiefly to the medical librarian, the pathologist and the paleontologist, but even the general medical practitioner may take delight in these lavishly illustrated and fascinating pages. We do not suppose that the publication of this

\* Paleopathology, an Introduction to the Study of Ancient Evidences of Disease, by Roy L. Moodie, Ph.D., Illinois University of Illinois Press, 1923 Price \$7.50 567 pp., 117 plates and 49 text figures

volume will pay, but we cannot refrain from congratulating the University of Illinois on their courage in publishing so important a volume.

Going back to first beginnings, we note that the lesions dealt with refer naturally chiefly to lesions of bones, since very little else is present in fossilised structures. Life began somewhere in the Proterozoic era, some 50 to 100 million years ago. As to its exact origins modern science and philosophy have often speculated. Did life arrive on earth, as Arrhenius suggests in the form of some living particle or spore-like form driven from the wilds of space or from the atmosphere of some other planet by the pressure of radiant light? Or, amid the chemical and radio-active complexes of the still hot earth crust and the newly condensing oceans,—did some new and radio-activated lump of proteid suddenly acquire the life-principle? Whatever happened, bacteria are known to have been amongst the very earliest forms of life they appeared in the Proterozoic era as non pathogenic and tree living forms, and have persisted ever since. Indeed the primitive protists may well have been of bacterial rather than of protozoal form.

From such a beginning the author leads us step by step and line upon line through the evidences in the eras. In the Paleozoic era and Cambrian period,—the age of invertebrates—disease was almost, if not quite, unknown. Later, in the Silurian period, traumas are found whilst commensalism began,—a notable instance of the latter being the gastropods which attached themselves over the anus of crinoids in order to obtain nourishment from the latter. Hypertrophy of external organs or of bodily parts is next seen, and, at a very early stage, simple fractures and callus formation which are still aseptic. The isothermal mammals were not infrequently subject to such fractures—the oldest known example of such a simple fracture being that of the radius of a *Dimetrodon*. Here a collection of radiographs of fractures in ancient reptiles present to the reader a most remarkable combination of the results of modern scientific medicine with ancient injuries. Dinosaurs appear to have not infrequently sustained fractures as the result of fighting with their competitors whilst even the *Mastodon* was not exempt.

Arthritis and osteomyelitis are two of the earliest diseases to appear in the geological records, and here Dr Moodie notes, with Huxley, how certain types of disease,—notably caries of bone and teeth, alveolar osteitis and various types of necroses and tumour formations—appeared early in geological time among the vertebrates and have tended to persist almost unchanged in character down to the present day. Spondylitis deformans appeared early in the Paleozoic age there are evidences of dental caries, pyorrhea alveolaris, and osteomyelitis associated with the age of amphibians. In the Mesozoic, the age of reptiles, such lesions as periostitis, hæmangiomas, bone necrosis, caries osteomata and a curious condition of death in opisthotonos which may have been due to tetanus or similar infections, are to be encountered. Fossilized red blood corpuscles are first encountered in the Harversian canals of *Iguanodon bernissartensis* a European dinosaur of the Mesozoic era.

The question of extinction of races has always interested both biologists and sociologists. In Chapter XI Dr Moodie discusses this most interesting problem. The gigantic amphibians and the labyrinthodonts after a short but vigorous period of existence during which they ranged from Spitzbergen to Australia and from Germany to Wyoming almost suddenly disappeared.

The extinction of the dinosaurs occurred gradually during the whole of the Mesozoic era, 9 to 22 million years ago. Disease can hardly be incriminated as the cause of extinction was it their gigantic size (for some of them were 70 feet in length and 14 feet high), their general unweildiness, or the introduction of small mammals which fed upon their eggs that was responsible? Or did tsetse fly and *malaria* have anything to do with it, for tsetse appeared about the close of this era?

Passing from the Mesozoic to the Cenozoic eras we note actinomycosis as a new infection, this disease appearing in the mandible of a three toed horse from the Miocene period. Thread moulds were probably the first fungi to invade bone, but were probably relatively harmless. This era was probably one of relatively short duration.

With the Psychozoic era, 550,000 to 1,000,000 years ago, we come first to the progenitors of modern man, and here a wealth of pathological material is available. Hookworm infection appeared very early, the *Pithecanthropus* of Java having been probably infected, as well as the fossil gibbon *Prohomo*. War appears upon the historic scene at a very early date and bony injuries from stone arrow heads are well described. *Pithecanthropus erectus*, approximately 500,000 years old,—shows an extensive exostosis of the femur, the oldest known pathological specimen in man. Trephining in ancient days was not uncommon, the subjects being usually females. A not infrequent operation for melancholia, as vividly illustrated in the frontispiece, was to make a crucial incision down to the cranial vault, to pour into the incision boiling oil, and possibly—in the highlands of Peru—to attempt to ease the subject's agonies by the application of coca leaves, chewed by the operator whilst operating. Not infrequently the operation was so severe as to cause subsequent ridges of callus formation upon the cranium. Amputation of finger joints in order to appease the gods was a frequent practice,—cave impressions of such mutilated hands 20,000 years old being found in Spanish caves from the late Palæolithic age. Pott's disease appeared very early in the history of the human race, it is recorded from Neolithic vertebræ of 5,000 B.C. and not infrequently among the ancient Egyptians. Clearly the tubercle bacillus has a very ancient history.

In ancient Egypt, as is well known, arterio-sclerosis was prevalent (and this—apparently—in the absence of both tobacco and syphilis), whilst other diseases recorded among mummies are small-pox, vesical calculus, schistosomiasis rickets, and a curious frequency of osteoporosis of the skull, the true ætiology of which remains a mystery. Syphilis may—or may not—have been present,—probably not. Osteosarcoma was known, whilst trephining was common. Splints of a primitive and usually inefficient pattern were used, whilst impacted third molars had already begun to appear in Cleopatra's time. Among the pre-Columbian Indians bone diseases were common, as also was trephining, whilst *Datura* was used as an analgesic for operations. Abscesses were drained by suction through a reed tube, and bark corsets were used for spinal lesions. The ancient Peruvians were well acquainted with espundia (S. American leishmaniasis), trephining reached a considerable degree of skill and achondroplasia and possibly syphilis were known.

Dr E. W. Berry, Paleo-botanist at Johns Hopkins University contributes a chapter on pathological conditions among fossil plants. Dr Moodie's remarkable book will be of great interest to a wide circle of readers, it represents the first authoritative exposition of a new and important branch of medical science, and we trust that it will receive the recognition which so careful and so lavishly illustrated a text-book deserves.

## THE INDIAN MEDICAL YEAR, 1923.\*

A survey of the papers published during 1923 by medical workers in India goes to shew how thoroughly individualistic is medical work in this country, and how correspondingly difficult to analyse for review. Further, whilst adopting a general division into medicine, surgery and hygiene, these subjects so overlap that differential treatment of any subject under these three sections is often impossible.

\* Unless otherwise stated, the commissioned officers referred to are officers of the Indian Medical Service.

## MEDICINE

**Malaria**—As our columns shew, the question of the number of species of malarial parasites is still a matter for further investigation and study. With regard to diagnosis, R B Lal shews that the aldehyde test, if applied with the technique advocated by Napier, is never positive in malaria. Majors Knowles and Acton, and B M Das Gupta shew that spleen puncture is of no value as a diagnostic measure in malaria, the spleen is the grave of the malaria parasites, rather than their site of multiplication, and relapses can be explained on purely mathematical grounds by a continuous water-typical schizogony cycle. Major Napier becomes the faster of the multithreshold. Major J J A Brachio, I M D, advocates pure air, and until a level below the febrile introduce of tincture of iodine orally three times daily by way of treatment. Major J A Sinton considers the malarial rigor as an anaphylactoid phenomenon and advocates the combined use of alkalies and quinine. His alkaline mixture consists of sodium bicarbonate 10 grains, sodium citrate 10 grains, to the ounce of water, whilst the quinine mixture contains 10 grains of quinine sulphate, 30 of citric acid, and 60 of magnesium sulphate to the ounce. The diagnosis of malaria having been proved, 3 grains of calomel are given, three doses of the alkaline mixture at 2 hourly intervals followed half an hour after the last dose by one ounce of the quinine mixture. In the evening a dose of alkaline mixture is given, followed by the quinine mixture half an hour later. Under this line of treatment, with 180 grains of quinine given in 7 days he claims a large percentage of cures without relapse.

The publication of Sir Ronald Ross' memoirs adds a classic to the literature and verifies in full his claims to "the great discovery." Lt Col C A Gill contributes two papers dealing with the important subject of forecasting malarial epidemics. In August 1921, a forecast for malaria in the Punjab for October-November of the same year was made based upon such factors as rainfall, economic conditions and the price of foodstuffs, and the previous presence or absence of malaria in certain areas. In general the outcome verified the forecast. The same procedure was adopted in 1922, and foretold the absence of any severe or general epidemic but probably local epidemic foci in Ambala district, in the riverine areas of the Sutlej, Beas and Ghaggur, and a moderately severe local epidemic, without increase in mortality, in Kangra district. All forecasts proved true except that the figures for Kangra have not yet come in, but it is known that there was no appreciable increase in mortality there. It is obvious that the forecasting of malarial epidemics, now possible in India thanks to the work of many different investigators, means that if the proposed epidemiological units can only be furnished for the country, they could be assembled together in anticipation of any epidemic outbreak, and a great saving of lives effected.

Colonel Gill also contributes an interesting paper on the subject of hill station malaria. At Murree, during the season, *A. gillmorii* is present in some numbers, and it was experimentally infected during July and August and transmitted experimental malaria to volunteers. Further, imported gametocyte carriers are present, and a large proportion of the resident population are non-immunes. Why, then, is malaria not prevalent? The author considers that indigenous malaria does occur in Murree, that for two months or so of the year both temperature and other conditions are favourable for transmission, but that the humidity in July and August is unfavourable. The question of protecting summer visitors, and especially children by mosquito nets arises.

With regard to blackwater fever, A N Ghore comments on its frequency in Dinajpur, and considers it to be a manifestation of severe sub-tertian malaria. He proves the courage of his convictions by treating cases with intravenous quinine.

**Kala-azar**—During the year the subject of kala-azar has received a considerable amount of attention in both the lay and medical papers, the former dealing

mainly with the "alarming" extension of the ravages of the disease in Bengal and Assam, and the organisation of relief by the formation of treatment centres. Between 40 and 50 papers have been published during the year in the medical press on this subject, contributed by workers in India. No dramatic advance towards the solution of the problem of the transmission of the disease has been made, but much work has been done on the subject. With regard to treatment certain decided advances can be claimed.

Our knowledge of the epidemiology of the disease has been added to by Lt-Col T C McCombie Young's study of the seasonal incidence on onset of the disease in Assam, by Major R Knowles Dr L E Napier and B M Das Gupta's study of the interesting distribution of the disease in Calcutta city, and by the work of Major J Cunningham and Dr P S Varadarajan in Madras and the surrounding districts.

A considerable volume of work on experimental kala-azar in animals has been reported. Out of 77 animals inoculated in Calcutta,—(Knowles, Napier and Das Gupta)—with spleen material, only seven contracted the infection,—2 puppies, 4 monkeys and a white mouse,—and even these shewed only a transitory infection devoid of symptoms. In Shillong, Major H E Shortt had a much higher percentage of successes, and produced infection in 10 out of 13 monkeys inoculated, whilst two of them shewed symptoms of acute kala-azar. He failed to transmit the disease to animals by feeding them on the supposedly infected excreta of kala-azar cases, but the Calcutta workers appear to have successfully transmitted acute kala-azar to a monkey by giving it large feeds of infected spleen material.

In a series of over 50 carefully conducted experiments, Major Shortt failed to infect vertebrates with insect flagellates, but he infected a bed bug with *H. ctenocephali*, and was able to produce "thick-tails" at will. Lt Col J W Cornwall expresses the opinion that Lt Col R Row's "resistant forms" in drying cultures are really only degeneration forms.

Major Shortt grew leishmania flagellates from the urine of four kala-azar cases, but Dr Napier and Das Gupta, working in Calcutta, failed to do this unless blood from the patient was added to the urine.

Dr P R Awati, in a limited survey of the biting insects of Assam, found that *Conorhinus* was present only in infected villages, but the evidence in favour of transmission by this insect has not been further strengthened. The work of Major Shortt and of Major Knowles, Dr Napier and Das Gupta tends to still further discredit the bed bug transmission hypothesis. The former worker also gives an interesting study of the pathology of acute kala-azar in monkeys, shewing that the endothelial cells are mainly affected. Dr M N De reported a case of noma of the cervix uteri in an afebrile and fatal case of kala-azar, and Dr D N Bannerji a case in which ulcers in the stomach wall shewed leishmania.

Drs D N Bannerji and I C Saha found that the blood sugar was always reduced in kala-azar, and in one case they reported reduction to the very remarkable figure of 0.031 per cent. Dr U N Brahmachari's case of dermal leishmanoid of 1922 was reported in two further medical journals in 1923.

Little advance is reported in diagnostic methods, but Dr Brahmachari has further elaborated his globulin test and Dr Napier has reported his further experience with the aldehyde test and spleen puncture findings. He finds that about 90 per cent of kala-azar cases shew *L. donovani* at the first spleen puncture, and that the aldehyde test first becomes positive about the fourth month of disease, and further, that a strongly positive reaction can be taken as absolutely diagnostic.

The classification of the antimony salts and compounds, with notes on their pharmacological properties and therapeutic values, was given in a paper by Major

R N Chopra and Dr Napier Dr Brahmachari gave further reports of his extensive researches on the toxic effects of both single doses and repeated doses of numerous antimony compounds, and also describes a number of new compounds. He also gives a summary of his researches on the question of the excretion of antimony, with details of methods for detecting small quantities in the urine and feces.

Reports on the treatment of kala-azar with the antimony tartrates have been published by Lt-Col F P Mackie, Major J Cunningham, Dr Dodds Price, Major Shortt and other workers. The consensus of opinion is that the two grammes which had been adopted by some previous workers is too low, and that the majority of cases require more than this total dosage, whilst there are some which are absolutely resistant to treatment with the antimony tartrates.

Considerable advance in treatment has been made by the introduction by Dr Brahmachari of the so-called "urea-stibamine," which has now had a fairly extensive trial and is reported on very favourably by himself, and by Major Shortt and R. T. Sen. It is claimed that patients can be completely cured by the injection of two grammes in 20 days. In our last issue a similar or even stronger claim is made by Dr Napier for the new preparation, "von Heyden 471", (meta-chloro-para-acetyl-amino-phenyl stibiate of sodium), but his experience has so far been limited to 11 cases. Further trials with this compound are awaited with interest, as it is claimed to be a definite chemical compound, and therefore probably more stable than "urea-stibamine." The use of salts of pentavalent antimony, first introduced and insisted on by Dr Brahmachari, is going to reduce the period under treatment from three months to three weeks, with an equal measure of success. A notable advance will have been made.

The complete failure of 'Bayer 205' in the treatment of kala-azar is reported by Dr Napier, who, in another paper reports unfavourable results with 'stibenyl' in ten cases.

The publication in 1923 by Drs Napier and Muir of their 'Handbook on Kala-azar' places in the hands of practitioners in India at a low price the whole essentials of knowledge with reference to the disease, and consolidates the present position,—only, we hope, as a preliminary to a further advance.

With regard to *Plague* the subject of transmission continues to receive the closest of attention. Major F W Cragg, continuing his former studies, examined 6318 rat fleas from the Punjab and U P. The prevalence of *X cheopis* and of plague shewed a general correlation, in some areas a very close correlation. With the help of Mr C S Swaminath he has studied the bionomics of *X astia*, and shews that few of these rat fleas survive for more than 24 hours after death of their rat host, further, that they will feed on man only with reluctance. Dr Fabian Hirst has studied the problem in Colombo. *X cheopis* predominates and is the more efficient vector. Further, *X astia* never behaves as a blocked flea with the proventriculus blocked by a solid culture of *B pestis*. Attempted transmission experiments to rats with *X astia* were all negative, whilst it was the most prevalent rat flea in the non-plague areas as against *X cheopis*, which prevails in the plague areas.

Major J Taylor and Dr G D Chitre, on the other hand, are less certain of the role of *X astia*. Experimentally they shew that *astia* will convey plague to rats and guinea-pigs, further it will bite man,—with reluctance,—at temperatures of 76 to 84°F, 72 per cent. of successful bites being recorded. The bionomics of *astia* require further study, but apparently climatic conditions suitable for *astia* prevalence are unsuitable for *cheopis*.

Dr G S Sahsrabuddhe, writing from Poona, very strongly advocates the use of Yersin's serum intravenously. It acts "almost like the neutralisation of an acid by an alkali," causing a temporary drop of the temperature to normal, and a steadier pulse. Major

C J Stocker has produced a sensitised anti-plague vaccine for the treatment of cases, and records the treatment of 19 cases at Peshawar with only one death. He is ready to provide this vaccine for the treatment of cases, on condition that the recipients report the results in detail. G A S Chawla draws attention to oedema of the leg following plague after excision of the buboes, a condition obviously due to lymphatic stasis.

With regard to *Deficiency Diseases*, Lt-Col R. McCarrison has continued his enquiry. He draws attention to adrenal hypertrophy in inanition and avitaminosis, apparently correlated with a condition of acidosis,—an emergency effort on the part of the body to compensate for respiratory disturbances, oxygen want, and falling temperature. The epinephrine functions seem to be dependent upon the activity of the oxidative processes in the body, are stimulated by cold and depressed by heat, whilst the glands adapt themselves to changes in oxidation and pH reaction by regulating the adrenal output. Excess of fats in the food of pigeons plus defective iodine absorption or metabolism, may enhance goitrous states, and there is a distinct relationship between the thyroid and the fat metabolism of the body. Cod liver oil protects completely against goitre due to insanitary surroundings. Ophthalmia occurs in pigeons fed exclusively on a diet of parboiled rice, but can be prevented by the addition of soil to the food. Apparently the condition here present is that the amount of vitamin B present is only just sufficient to maintain life at a low ebb, whilst the deficiency in vitamin A produces its effect in the characteristic ophthalmia. An analogy is drawn to conditions in Tanjore, where ophthalmia is prevalent but beriberi is rare whilst the Tanjore rice causes similar ophthalmia in experimental pigeons.

The same author has also studied the epithelioma contagiosum of fowls which occurred in a batch of pigeons, fed on washed, milled rice, and suffering from polyneuritis columbarum. He attributes the disease to an invisible virus, acting on birds suffering from vitamin deficiency, endocrine disorder and abnormal metabolism.

Lt. Col J W D Megaw and Dr R N Bannerji discuss the problems of beriberi and epidemic dropsy. Two localised outbreaks of the latter disease at Allahabad are detailed. In both cases the evidence incriminates infected rice, but is not conclusive.

Lt. Col Megaw deals with the question in greater detail in later articles. Polished rice differs from unpolished in other factors as well as in vitamin content, in fats, phosphorus and proteid content. Also it is less stable and more liable to deterioration. Avian polyneuritis differs in many particulars from beriberi as seen in man and may not be the same disease. The beriberi and epidemic dropsy group of diseases appear to overlap, but are practically confined to eaters of parboiled and milled rice. Deficiency of vitamin B probably aggravates, rather than causes these diseases. There may be a human disease due to deficiency of vitamin B, if so the symptoms probably are those of multiple neuritis and cardiac depression, whereas cardiac excitation is probably a constant feature of beriberi and epidemic dropsy. A review is given of the measures suggested for rice control and for the need for a well balanced diet, a combination of these can be relied on to prevent the disease, reliance on the vitamin deficiency view alone is unsafe.

Major G G Jolly comments on the use of germinated pulses and beans in the natural dietaries of Burmans and advocates their introduction into the dietaries of police forces and jail prisoners. Dr J L. Das finds the dietaries of Indian schoolboys in Bihar and Orissa sufficient in carbohydrate and caloric values, but largely deficient in proteins, fats and vitamins, he outlines a sufficient and balanced diet at a cost of Rs 10 p.m. With regard to *lathyrism* A. Howard, J L. Simonsen and Major L. A. P. Anderson consider that the toxic element responsible resides in a weed, *Vicia sativa*, in



in hospital. Most cases by the time they come into hospital have become converted by injudicious douching into chronic gonorrhœa with cervicitis. He advocates excision of Bartholin's glands, amputation of pseudo-hypertrophied cervixes, and in general a permanganate douche, followed by local application to the cervix of 25 to 50 per cent zinc chloride and an iodoform gauze pack.

Major W. L. Harnett deals with the very important criteria for cure of gonorrhœa in the male. Cultural examination is useless, and the absence of gleet and of threads in the urine is no guarantee of cure. He advocates first examining the anterior urethra with the urethroscope. The bladder is next filled with 1 in 2,000 mercury oxycyanide, and the prostate and seminal vesicles massaged. Films of the discharge are made and stained and the total number of leucocytes in 20 or 30 microscope fields recorded, as an average per field. If the count is only one or two per field and no gonococci are found, the case is probably cured. To ensure this the test is repeated after three days' use of alcohol. Of 88 cases treated in an Indian war hospital at Constantinople 64 reached this standard of cure, and none relapsed.

Capt. A. P. Pillay analyses the results of cases of gonorrhœa treated by different methods but lays down no hard and fast line of treatment as the best, chronic gonorrhœa in the male as well as in the female, is one of the most difficult problems in therapy.

Turning to *tuberculosis* the usually accepted view that Indian cattle are free from infection is now less firmly held than it was. Mr. M. H. Sowerby, I.C.V.D., records the case of a cow in the Bombay presidency found heavily infected, and refers to findings by Taylor in 1915-1917 of 3½ per cent of cattle slaughtered at Ferozepore infected. In treatment, Major J. L. Sen advocates E. C. C. O. for tubercular adenitis, and Lt.-Col. F. F. Elwes summarises the present position of sodium morrhuate therapy. The drug is of considerable value in increasing the weight of patients and making them generally fitter, it is a most useful therapeutic agent, but it is far from being a cure for phthisis. Of other lines of treatment *intravenous iodine* is advocated by Lt. Col. W. W. Jendwine who presents the whole case for this mode of therapy on a large statistical basis. The doses used are from 1 to 2 c.c. of the tincture, preceded and followed by saline irrigation of the vein in order to avoid thrombosis and diluted to 10 to 20 c.c. with saline. The injections are sometimes followed by a rigor, and a high and persistent leucocytosis follows. In all septic states such as boils and carbuncles the treatment is apparently very good, but its greatest value of all, he claims, is in "septic lung" (bronchitis and bronchiectasis), and it is of value in early and second stage phthisis. He pleads at least for a further and extensive study of the method.

Of other advocates of intravenous iodine therapy N. K. Menon records its use in chronic arthritis and in a case of abscess in Douglas' pouch, Dr. A. K. Mitra uses 5 to 10 minims diluted with water in gonorrhœal arthritis, carbuncles, whitlows and septic lesions, P. B. Mukherjee records its use in two cases of septic dog bite, and Dr. K. Daleppa advocates it for tubercular adenitis. The whole question of the real value and indications for intravenous iodine demand further study however.

*Dengue*—Lt. Col. J. W. D. Megaw attacks the position of those who hold dengue and sand-fly fevers to be clinically distinguishable diseases, pointing out that cases occurring in a dengue outbreak may present temperature charts and symptoms typical of sand-fly fever, and *vice versa*. He would prefer to classify provisionally both diseases as dengue until the virus has been worked out and to refer to them as mosquito-dengue and sandfly-dengue respectively. He discusses the relationship between these fevers and those described by Whittingham and Couvy in which a spirochæte was found, Whittingham calls the fever sand-fly fever, while Couvy calls it dengue, yet the fevers appear to be identical. In the article by Megaw a curious clerical error occurs, the

name of Ledingham being substituted for that of Whittingham in two or three places.

The differences between Japanese seven day fever and Rogers' seven day fever or seven day dengue are pointed out. Stress is laid on the duration of the disease cycle in the fevers which show a tendency to relapse, dengue, infective jaundice, relapsing fever and rat bite fever being included in this group.

Capt. C. J. Stocker records an interesting piece of work in connection with an outbreak of "seven-day fever" in the 79th Carnatic Infantry at Rangoon. In blood culture a bacillus with reactions resembling those of *B. fecalis alkaligenes* was isolated in 6 out of 27 cultures, the growth, however, being scanty in broth, even at 48 hours. Cultures from 9 out of 24 locally caught culex gave a similar organism. It will be remembered that Sir Leonard Rogers cultivated an organism of the coli group from some cases of seven day fever. The blood picture showed eosinophilia at the 5th to 9th day of disease.

Dengue has swept India, as far as we can ascertain, in 1923, all the Presidency cities having suffered severely from the disease, which has been of a particularly virulent type. That the aetiology of the disease is not yet established is clear. It would appear that there is undoubtedly a type of fever lasting about seven days due to *B. fecalis alkaligenes* infection in the blood stream—(it was seen in Mesopotamia during the war, as well as by Captain Stocker in Rangoon)—but whether this is or is not identical with true dengue is a moot point, probably not.

Relapsing fever has been recorded from Madras for apparently the first time for nearly a century, whilst Dr. M. J. Permanand contributes an interesting clinical account of four cases of *rat bite fever* from Bombay. Temperature charts of infected guinea-pigs are given, whilst it is important to note that, as is most unusual with spirochætes, *S. moraus-muris* is more readily detected by examination of stained blood films than by dark ground examination. The white mouse is, par excellence, the experimental animal in which to maintain strains of the virus.

Major E. S. Phipson analyses the great influenza pandemic of 1918 with special reference to Bombay in an able and most interesting article, shewing how clearly the two-wave phases were seen in Bombay and the high mortality associated with the latter wave. He also comments on the energetic way in which local and Indian volunteer aid came to the rescue and on the fine work done. Major H. W. Acton discusses the causation and treatment of *asthma*, a disease of special importance in Bengal. He traces bronchial spasm to poisonous amines, and shews that it can be experimentally produced by such bases as histamine and arecoline. Three factors are concerned, the poisonous bases which cause constriction of the bronchial musculature and turgescence of the bronchial mucosa, the defensive mechanism of the body, which largely resides in the capacity of the liver to neutralise such poisonous bases before they can reach the lung, and the tonus of the nerves concerned. Of extrinsic causes we have the volatile emanations from animals, pollens, etc. Of intrinsic causes we have respiratory tract bacterial infections which lead to the production of poisonous amines, intestinal factors leading to a similar result, and certain foodstuffs. The defensive mechanism consists of an eosinophilia, a hydrogen ion concentration unsuitable for the action of these poisonous amines, and the liver "barrage". Finally endocrine activity governing the activities of the sympathetic nervous system. Asthmatics may be grouped into vagotonics, those with sympathetic predominance, and a mixed group of both. Hence treatment is a question of analysing the causes and conditions present in each individual case and dealing with them. N. C. Ghose records a case of asthma in a boy apparently due to peripheral (nasal) irritation.

As regards *small-pox* Dr. N. H. Chosky contributes an article to a correspondence in the *B. M. J.* on the differential diagnosis between small-pox and chicken-pox,



based upon his many years' experience at the Arthur Road Infectious Diseases' Hospital in Bombay. It the type of eruption and vesiculation be carefully studied, he points out, mistakes are almost impossible.

Chicken-pox may be quite a severe disease in some cases. Major J. J. A. Brachno, I. M. D., advocates 10 minims of tincture of iodine orally three times a day and also the external application of the same.

**Snake-bite.**—The publication of Colonel F. Wall's book on "How to identify the snakes of India, Burma and Ceylon" will be welcomed by civil surgeons. Bell Ram records two fatal cases from Garhwal. Two brothers were sleeping on the floor of a house together. One was awakened at 3 a.m. by what he thought was an insect bite, and dropped off to sleep again. At 6 a.m., on waking, he discovered a snake in the room, and ran to hospital. Typical symptoms of colubrine intoxication set in, and despite the intravenous administration of 80 c.c. of fresh antivenene, death occurred in some nine hours. The younger brother who had slept with him did not even know that he had been bitten, but developed the same train of symptoms and died some hours later. It is concluded that the cases were due to krat bite. The Rev. Father J. F. Crus and Capt. K. R. K. Iyengar have been trying for two years to concentrate the standard Kasauli antivenene. They conclude that the immunity principle resides in the antivenene-proteid aggregate—(it was shewn years ago by Acton and Knowles that it resides in the globulin fraction)—and shew that by desiccation in vacuo the antivenene can be concentrated to twice its original potency—a concentration however which still leaves the serum too weak for practical purposes. They further advocate the dilution of the present serum with an equal part of saline or water before injection, when the action seems to be somewhat reinforced and the risk of anaphylaxis lessened. This most important problem in Indian medicine however, to-day remains still unsolved—although not we believe insoluble.

**Skin Diseases.**—The special skin out-patient clinic at the Calcutta School of Tropical Medicine is becoming more and more widely known. Here we have the beginnings of a systematic and organised research of very considerable importance in Indian medicine, orderly classification and new light thrown upon old problems. The paper by Major H. W. Acton and Dr. Ganpati Panja on leucoderma is an instance. True leucoderma should of course be carefully differentiated from the pseudo-leucodermas of leprosy, syphilis, etc. Melanin is produced by the melanoblasts by action of a ferment tyrosinase from a mother substance which is probably an amino-acid of the aromatic series. Given a deficiency in the supply of this mother substance and however active the melanoblasts leucoderma will ensue. On an analysis of 100 cases seen the age distribution ranged from 4 to 52 years and local irritation often seems to play a part in determining the onset. The affected skin is normal except for the pigmentary defect. Clinically the disease always starts with a herald spot—78 cases. Four types can be distinguished: the melung type with symmetrical distribution on the limbs; the *dhoti* type, especially affecting the iliac crests; the muco-cutaneous type, affecting the junctions of skin and mucous membranes; and the diffuse type. When the patches become inflamed we have red or inflamed leucoderma. The supply of the necessary amino-acids is partially under control of the endocrine functions and these may need investigation. Treatment is so far frankly experimental. At present the best results obtained have been from the use of *bouchu* (*Psoralea corylifolia*) the seeds being given orally, and the expressed oil as a local application.

The term *eczema* is now no longer used in this clinic instead every attempt is made to establish an accurate diagnosis. Many cases are cases of seborrhoeic dermatitis or of streptococcal origin. Dr. U. N. Mandal working in the clinic, analyses the streptococcal affections of the skin. The long chained strains appear to be the more virulent and also the hæmolytic strains. Rabbits injected intravenously with these strains tend

to die after a period of from 10 to 30 days, not from septicæmia so much as from chronic arthritis and diarrhoea. The lactose-fermenting property appears to go *pari passu* with lactic acid production and vesiculation.

For *Naga soru*. Dr. R. B. Abraham advocates hot dressings of cal. chlorimata, together with intravenous antimony tartrate. He claims that this materially reduces the period under treatment. Lt.-Col. E. C. C. Maunsell records what appears to be the first case of *mycetoma* infection met with in Coorg, and D. N. Ghosh records the first case which he has encountered in 24 years of work in the Sonthal Perganas.

**Of heart diseases.** Dr. S. C. Bose records a case of auricular fibrillation successfully restored to normal rhythm by the administration of quinidine, after the failure of large doses of digitalis. Major R. S. Townsend records cases of sudden death due to rupture (a) of the cardiac muscle, and (b) of a small aneurism of the first part of the aorta into the pericardium, whilst K. K. Pillai records a similar case due to rupture of an aneurism of the terminal portion of the ascending aorta into the pericardium. **Of nervous system diseases.** Capt. J. C. De records a case of (?) encephalitis lethargica with Parkinsonian syndrome and J. W. McK. Nicholl one of progressive muscular dystrophy. In the field of *mental diseases* Major O. A. R. Berkeley Hill submits a plea for a mental hygiene movement in India similar to those in Great Britain and in the United States, and contributes an edifying analysis of the etiology of the psychopathic child, parents of such children he would classify into those who tyrannise over their children and those who allow their children to tyrannise over them. In treatment of mental cases he relies above all else on carefully arranged and suitable occupational therapy supplemented by hydrotherapy and amusements. The hospitalisation of asylums in India having been secured there are several other reforms which he urgently desires: the abolition of the barbarous custom of keeping suspected insanes in jails for observation; the sending of female European patients to Ranchi without an accompanying European nurse; the introduction of special mental nursing sisters trained for these special duties; and the revision of the conditions under which European insanes are transferred to the United Kingdom. The parole system at Ranchi is yielding excellent results: the patients are provided with concerts, dances and a brass band and he now requires a cinema, which we are sure that he will get.

In *carcinoma* Dr. S. Mallanah advocates treatment by injections of tumour antigen, obtained by emulsifying alcohol-dried extracts of tumour in saline. Lt.-Col. T. C. Vaughan (ret'd.) gives a review of the first six months working of the Radium Institute at Ranchi. The results in benign tumours have been excellent but the Indian patient with carcinoma arrives at the last phase and usually desires to leave immediately improvement is noticed. Good results are recorded in uterine fibromata and carcinoma of the breast. Continuing his series of observations that secondary nodules at too considerable a distance from the primary lesions to be affected by direct radiation often clear up in the most surprising manner, he is now trying treatment by injections of the patient's own blood removed into citrate-saline and irradiated at body temperature. The growth of the X-ray department at Madras under the highly skilled direction of Capt. T. W. Barnard (late R. A. M. C. and formerly radiologist to the London Hospital) is shewn in an increase from 2,531 examination in 1919 to 11,757 in 1922.

Of many miscellaneous matters we may select the advocacy by Raja Ram of local injections of 10 to 15 minims of a solution of sodium salicylate, 15 grains to 15 c.c. locally in acute rheumatism and by D. M. Vasavada of sodium salicylate plus sodium iodide intravenously in the same disease. Capt. A. P. Pillay's interesting analysis of methods of malingerers in the Indian Army, and his case of sudden blindness supervening in an Indian female aged 60 six days before the onset of

fatal apoplexy Capt A F W da Costa, I.M.D.'s case of infantile biliary cirrhosis at Nagpur, and the publication of Dr S K Mukerji's little book on the same mysterious disease 48 cases with a 63 per cent case mortality are analysed and a full bibliography given. The disease is one of infants or from 6 to 24 months of age and its true ætiology still demands explanation. Capt G Shanks's report as Professor of Pathology to the Medical College Hospitals, Calcutta, in 1922 emphasises the extreme importance in India of blood culture in all cases of pyrexia of uncertain origin, plague, typhoid, streptococcal septicæmia and other conditions were all diagnosed by this method. Major A P G Lorrimer's analysis of the problems of an out-patient department in a big Indian hospital in the 1922 report of the Madras General Government Hospital, also deserves mention since it is the first really lucid and detailed study of such problems that we have seen. Whilst Major W L Forsyth's remarks (in the same report) on the number of Indian patients admitted to hospital in a moribund state—(20 out of 490 last year at Madras)—will arouse a sympathetic response from all workers in India in charge of both medical and surgical wards "B. I. D.'s" in a London hospital mean a pecuniary reward for the resident on duty, in India they mean hours of wasted and unrewarded toil spent in attending the courts.

#### PHARMACOLOGY

In the field of pharmacology five papers call for specific mention, apart from those already noticed. Continuing their studies of indigenous Indian drugs, Major R N Chopra and Drs B N Ghosh and S Ghosh have investigated the properties of *punarnava* (*Boerhaavia diffusa*), as a diuretic and cardiac stimulant. The active principle they find to be an alkaloid, punarnavine, whilst the excess of potassium salts in the plant also increases diuresis. Doses of one to two drachms of the liquid extract act as a powerful and safe diuretic. This newly introduced drug is of especial value in the ascites due to early hepatic cirrhosis and chronic peritonitis, in renal ascites and similar conditions it is of less value. The paper constitutes a model of what is wanted in the way of research work into the value, or otherwise, of indigenous Indian drugs.

Major Chopra and Dr J B McVail also contribute an interesting report on the place of *carbon tetrachloride* in pharmacology and therapeutics. It is the most efficient anthelmintic known for hookworm, but is of little value for ascariis infection, and of none for tænia infection. The toxic dose, 1 to 4 c.c. per kilo body weight, is far below the therapeutic dose, 0.13 c.c. per kilo, or a total dose of 4 c.c. for an adult. The drug is but slowly absorbed from the alimentary canal, and hence large doses may be administered. Given in medicinal doses and followed by a purgative, it is safe, but if inhaled into the trachea, alarming symptoms may follow, hence it is particularly unsuitable for struggling children. The chief contra-indication against its use is hepatic deficiency, whether caused by alcohol or other toxæmia, although it has been frequently and successfully given in cases of kala-azar with enlarged liver, also, possibly, heavy roundworm infection. The drug has a depressant effect upon both voluntary and involuntary muscle, and toxic doses depress the liver parenchyma, although recovery is, as a rule, rapid. Hence carbon tetrachloride, given with a subsequent purgative, is to-day probably the safest and most efficient mode of treatment on a large scale for hookworm infection.

Major Acton contributes two papers. One is on the action of selective or *specific drugs*. This depends (a) on their chemical constitution, thus alkaloids act as bases, and dextro- and lævo-rotatory salts may act in an entirely different manner, (b) on the hydrogen ion concentration of the tissues and fluids in which they act, (c) on their diffusibility through cell membranes. Some kill parasites by starvation rendering their pabulum from the tissues unpalatable, others reduce the natural rate of multiplication of parasites to such a

degree that the body resistance finally determines their demise. The ideal specific drug for any infection should destroy the invading micro-organisms at a concentration far below that toxic to the body, should have a high rate of diffusion throughout the body tissues and fluids, the site of its maximal concentration in the body should coincide with that of maximal multiplication of the invading micro-organisms, whilst, finally, the H ion concentration in which the causative micro-organisms best thrive should coincide with that at which the drug exerts its most potent effect. A little clear thinking on such lines might do much to improve present day therapy.

In a second paper the same author discusses the importance of the environment on drug actions. Thus quinine is lethal to *Paramacium* in a dilution of 1 in 10,000 at a pH of 7, but in a dilution of 1 in 100,000 at a pH of 8, and the action of both emetine and quinine may be capable of immense improvement if the environment in which they act could only be rendered more alkaline. Inorganic basis and salts of heavy metals act best in an acid environment, some organic basis, such as quinine, emetine and some amines, such as trimethylamine, require an alkaline environment, others each require an optimum and pH of their own.

A Roy discusses the merits of the Ayurvedic system attempting to claim analogies between *vayu*, *pitta* and *kapha* with the hormones and endocrine secretions. In matters of diet he commends to the European practitioner the careful study made by the system, and raises several points calling for attention.

#### SURGERY

In the field of surgery, the papers are even more individualistic than in that of medicine. Of the more general papers, perhaps that by Lt-Col H Halliday on the operative treatment of *Fractures* comes first. He is a warm advocate of Lane's method of plating, but insists that the technique shall be above reproach. "The setting of fractures is a myth," and no one has yet seen a Pott's fracture set with a perfect result. His technique involves several points which demand attention, the use of sterilised stockinet to surround the limb, no tourniquet, the raising of the periosteum en bloc with the superlying tissues by Ollier's rougine so as to preserve its blood supply, the use of Lane's forceps to hold the pieces in apposition and of the biggest plates and screws that the bones will take. Rarefying osteitis, he considers, means sepsis, whilst he emphatically condemns the pernicious practice of sawing off pointed ends. A series of very remarkably successful results concludes his most valuable paper. Enormous advances have been made in Europe during the war in the operative treatment of fractures, but India still teams with cripples with shortened or deformed limbs, the results of bad treatment of fractures. The scope for orthopædic surgery in such work is unlimited, but to be successful the most perfect aseptic technique is needed and the utmost attention to details. Capt M L Treiston's paper on rarer types of fracture of the radius and carpal bones illustrates the excellent results which may be attained by modern methods in these crippling injuries, whilst P T Kothary describes the appalling gangrene following the use of secret remedies in compound fracture cases.

Second come two informative contributions by Lt-Col E W C Bradfield, the first dealing with the *surgery of chronic dyspepsia* in Indians. This breaks ground which is almost entirely new in India. He shews that gastric and duodenal ulcers are common enough if looked for, and are as amenable to surgical treatment in India as in England. Over 80 such cases were operated on in ten months at Madras. The selection of cases suitable for operation is mainly dependent on the radiologist and the X-Ray findings to look for in such suspected cases are delay in the passage of the bismuth meal, bismuth deposited on an ulcer cavity, and notch due to spasm of the gastric wall. Prognosis is good if operation be resorted to early, but practitioners

are loth to send cases to the surgeon, the Indian patient goes downhill faster than does the European, and late operation is attended with bad figures. The chronic abdomen is a subject of even greater importance in India than in England, since so many factors, special to the tropics, such as the dysenteries, sprue and the frequency of abdominal tuberculosis, are involved, whilst in a population infected to some 60 per cent with *Oryzias* the appendix is of special importance.

In the Madras Hospital report for 1922 the same author considers the subject of *Tetanus*, contrasting Sibthorpe's figures for the decade ending 1886 with those for the decade ending 1922. Whilst modern aseptic surgery is banishing tetanus from the surgical wards in India, the case mortality—67 per cent—still remains as high as ever. The reasons are that cases are treated in sheds and most unsuitable surroundings, and the want of antitetanic serum, which, in Madras in 1922 was only obtainable through the generosity of a private individual for poor patients. Of other papers on tetanus Major F J W Porter, R.A.M.C. (ret'd), details a case of intestinal obstruction followed by fatal tetanus, and raises the point as to whether tetanus bacilli ever escape from the gut into the tissues, whilst R S Tembe records five consecutive cases of recovery under treatment with serum and injections of carbolic acid.

Dr J Gravesen analyses the results of using artificial pneumothorax and other surgical methods in *phthisis* at Madanapalle, giving full details of technique. Of 62 cases treated by pneumothorax, evidence is available as to end-results in 54 of whom 34 benefited but temporarily, 20 benefited very markedly, some returning to their occupations. When fluid is present a dual apparatus for gradual withdrawal of the fluid plus the injection of air or nitrogen is advised. Capt R V Rajam records a case of pyo-pneumothorax following pneumonia and pointing as a superficial abscess in the scapular region.

Many interesting abdominal cases have been recorded during the year. Dr S Bannerjee records a case of hydatid of the liver cured by aspiration, and Dr E F Neave a case in which cysts were enucleated from both lobes of the liver of a Mahomedan child aged 12, who subsequently recovered. Lt-Col W W Judwine calls attention to cases—usually fatal—resembling paralytic ileus occurring apart from any recognisable cause—a type of case which the writer has encountered and which is probably far from rare in civil surgery work in India. The true etiology is doubtful. The same writer comments on the sort of cases that a civil surgeon in India has to tackle—a dermoid cyst in the abdomen of a girl of 14, a case of congenital stricture of the urethra in a boy of 3, and a congenital lymphangioma in a child of 7 months of age, as a month's sample. Cases of rupture of the intestine rarely survive for more than 24 hours before they come to operation, but Dr L W Hefferman records a successful case of suture after this long interval, whilst Major Porter's case of recovery after an operation for intestinal obstruction following an operation for appendicitis and general peritonitis, illustrates the acquired immunity which seems to make the peritoneum more tolerant of a second operation.

A case of *splenectomy* on a spleen transposed to the right side of the abdomen is recorded by C P Ipe, and another for a stab wound of an enlarged spleen by Dr Hefferman. One of the most amazing cases in the literature is that recorded by Lt-Col A J Vernon Betts. A Mahomedan woman, aged 28, who had suffered from repeated attacks of malaria, was admitted to hospital with a hard impacted tumour in the true pelvis. A diagnosis of uterine fibroid having been made, laparotomy was carried out but the tumour proved to be a wandering spleen with a long pedicle, impacted in the pelvis.

Major V N Whitmore discusses cholelithiasis and its significance, and Capt J C De the etiology of Hirschsprung's disease, of which a case of congenital

origin in a boy of 16 was very much relieved by medicinal measures alone. Cases of imperforate anus are fairly common, but the co-existence of a communication with the bladder is very rare, and Dr J M Chopra is to be congratulated on the successful issue of his case, in which this complication was met with. Major C H Reinhold records a case of irreducible inguinal hernia in an infant, the obstruction being due to a mass of enlarged mesenteric glands. Major W R Stewart records a most interesting line of treatment of *psaos abscess* by oxygen inflation. The patient had a double psaos abscess and the two cavities communicated. Each was in turn aspirated and then distended with oxygen. There were traces of oxygen in the abscess cavities up to three weeks later, and the patient made an excellent recovery. S Subhao Rao describes a case of intestinal obstruction in a woman aged 20, due to the formation of a complete adventitious sac, 6 by 3½ in size, formed by cicatricisation of chronic adhesive peritonitis, and containing five loops of small intestine closely compressed and adherent to one another. Major R T A MacGregor comments on the rate of growth of vesical calculi, a patient had a stone removed from his bladder in 1914, 8 years and 3 months later he returned with two stones, one weighing a drachm, the other a tiny faceted one.

Perhaps the most interesting abdominal case, however, is that recorded by Colonel W G Pridmore. A clerk swallowed an entire lower artificial denture whilst taking his tea one day at 4.15 p.m. Being awakened by violent colic at 2 a.m., he ate one lb of bread. The next day he did his work as usual and was then despatched to Madras for X-ray examination. Whilst about to be X-rayed, he had a desire to defæcate, and passed the denture entire per rectum 66 hours and 50 minutes after having swallowed it.

The method of transplanting skin by *tube grafts* is of very recent introduction and is capable of wide application in this country, where mutilating burns and ulcers are so common. Dr Hefferman's interesting account of the use of this method in a case of cancer of the mouth, we believe, the first recorded in this country. *Tumours* are often allowed to grow to a very large size in India before the surgeon is applied to for relief, and the cases of enormous lipomata recorded by Drs G C Ramsay and L W Hefferman are typical of the sort of work which is encountered in rural areas in India, but is never seen in Europe.

Professor W Burrige calls the attention of surgeons to the importance of thyroid hormone in determining the energy output of the heart. When total thyroidectomy is performed, this supply is suddenly cut off, and this may be one factor in the post-operative mortality. The moral is to give small doses of thyroid extract to such patients after operation. Dr F R Parakh draws attention to the difficulty experienced in the preliminary ligation of the large vessels when amputating at the shoulder. He advocates commencing with a posterior incision from the clavicular attachment of the sterno-mastoid down the axillary border of the scapula to its angle. As the limb falls away of its own weight, the large vessels are exposed and can more readily be tied from this line of approach. Of *malignant disease* Dr E F Neave records an encysted ovarian sarcoma in a woman of 20, and a melanotic sarcoma of the rectum in a man of 53, and F D Bana a case of epithelioma of the larynx, misdiagnosed as gumma. K. N. Pradhan discusses the treatment of furunculosis of the auditory canal and mastoiditis by zinc and salicylate ionisation—a method which gives very promising results.

Of many further individual cases of interest several may be omitted as less important, but probably the palm must be awarded to Mangal Singh's use of a pair of midwifery forceps to remove an enormous stone from the bladder whilst Dr A B da Castro's quaint case of an accessory mouth of congenital origin—but (it seems to us)—possibly of accidental or self-inflicted origin, comes a good second.

treatment is best given in the early morning on a fasting stomach, and thymol is about a quarter of the price of beta naphthol. They comment on the increased marketable value of treated labour forces and reduced general mortality and morbidity rates.

Dr J W Tomb analyses hookworm infestation in the Bengal coalfields. 72 per cent of underground labour and 53 per cent of surface labour was found to be infected. 70 per cent of the worms removed were necator. The hæmoglobin index in the infected was 65 per cent as against 80 per cent in the non-infected, whilst the surrounding agricultural population shewed less infection. He concludes that there is no practical remedy within reach, and that there is little if any evidence of the presence of hookworm disease, as against hookworm infection.

Dr G C Ramsay raises the question of pigs as disseminators of ankylostomiasis. He shews that the health is better in such tea gardens as do not permit their coolies to keep pigs than in the others, and has found ova of hookworm, roundworm and whipworm in the stomach, and even buccal cavity and œsophagus of pigs. *Balantidium coli* he also believes to be relatively common in these animals in Assam. Dr J B McVail enquires whether these were ova of human helminths or of natural parasites of the pigs concerned, he shews that ova of human ankylostomes will not survive a temperature higher than 98.4° F for any length of time, whereas the temperature of the pig's intestine must be about 104° F. S K Roy discusses the developmental stages of *Strongyloides stercoralis* from the ovum to mature stages, and associates this parasite with anæmia.

**Vaccination**—Lt-Cols W F Harvey and S R. Christophers, returning from the Fourth Congress of the Far Eastern Medical Association, proceeded to describe Nijland's technique in Java for maintaining vaccinal lymph at full potency. The secret of Nijland's technique is that he never uses the same species of animal twice running as a vaccifer, the virus is passaged successively into a rabbit, cow calf, and buffalo in rotation.

Majors J Cunningham and J A Cruickshank publish a series of papers and reports which constitute a notable advance in the Madras Presidency. Dissatisfied with the increasing fall in the success rate with lanolinated lymph, the Directors of the King Institute have been experimenting for some years with the possibility of obtaining a glycerinated lymph that will give better results. The success rates had fallen from 95 per cent in 1907 to 77 per cent in 1919. Adapting Nijland's technique, and a new glycerinated lymph they have produced supplies which, on experimental test on the Saidpet range and elsewhere in Madras, gave a success rate of 96.7 per cent. They advocate (a), the use of Nijland's technique, (b) to leave over the question of the proposed establishment of a seed depot in the hills until further experience has been gained with the present procedure, (c) to continue the present procedure, and (d) to stop vaccination in the Presidency during the three hot weather months, and carry on intensive campaigns in the cold weather. In addition they demonstrate the necessity for new standards in testing lymphs, and describe a new test on the dilution principle, by which the lymph is diluted to a given degree and sown in lines, the results being estimated by the number of discrete vesicles per linear inch sown. This gives reliable results, both in the vaccine institute and in the field. With regard to the claim made by S S Bey that intravenous injections of tartar emetic may give good results in variola, they shew that such injections have at least no effect at all upon vaccinal lesions in the calf.

With regard to *Rabies* the publication of Major Acton and Colonel Harvey's big memoir on the degree of efficacy of antirabic inoculation raises questions of fundamental importance, and it seems to us that this memoir has not received half the attention from the medical journals that it should have done. In brief,

whilst their conclusions are studiously refrained, the entire memoir constitutes an attack on the whole of the Pasteurian method. Experimental animals may owe their supposed immunity rather to the difficulties of experimental trephining than to real immunity conferred by the treatment, the wider and more careful the enquiry into the real mortality from hydrophobia among the untreated, the lower becomes this figure, whilst, in a general mixed population under treatment at a Pasteur Institute, which includes persons undoubtedly not at risk at all, persons at little risk if any, and persons at varying degrees of risk, the usual annual mortality of about one per cent may not be far from the corresponding figure for a similar untreated population. Here to-day we still work in the dark, and still await the only discovery which will clear up the problems of rabies—the discovery and isolation of the micro-organism of the disease.

The demand by the public for the issue of antirabic vaccine having become insistent, the Coonoor Institute is now trying a large scale experiment by sending out the vaccine by post to government headquarters hospitals throughout the Presidency, so that cases may be treated at any headquarters hospital. This issue is frankly experimental, and at other institutes the directors concerned refuse to guarantee the potency (whatever it may be) of the vaccine after it has left the institute. Two or three years must elapse before the statistical results of the Madras experiment, collected on a large scale basis, can be contrasted with those at the established antirabic centres in India. Lt-Col A E Hammerton, R A M C, describes the foundation of a Pasteur Institute at Bagdad, discussing cost and difficulties encountered, and the limitations of treatment.

**Water Supplies**—The provision of safe water supplies is a paramount problem in India. Under certain conditions the introduction of a pure water supply reduces not only the mortality from water-borne diseases, but from general causes. This, the Mills-Reincke phenomenon, is discussed by T N S Raghava Chari in its application to India, who finds that the Indian statistics do not support the theorem. The reason is that in India statistics are generally unreliable, Calcutta, Howrah and Darjeeling, for instance, have fully protected water supplies, yet these places head the list in incidence of dysentery and diarrhoea for Bengal, the reason being that the records are probably fairly accurate for these urban municipalities, and wholly unreliable for the others. These findings probably explain Mr V D Pillai's note, as an engineer, on the failure of improved death rates to follow upon the introduction of pure water supplies in certain Madras towns. J L Pinto notes upon the improvement of the Poona water supply with simple storage. In this supply the water settles for three days before entering the distributing mains. Observations go to show that a 75 per cent reduction in bacterial content follows, but this does not apply to monsoon weather and heavy rain.

Major A D Stewart, in an interesting paper on *Disinfectants* comments on the need to think out clearly beforehand what is wanted. A simple deodorant, a disinfectant which will kill ordinary faecal bacilli, or a strong spore-bearing germicide may be wanted under different circumstances. Finally, ease of emulsification and cost are also factors concerned. Formaldehyde is an efficient germicide, but of no value as an insecticide, sulphur dioxide is the reverse. Quicklime is a most suitable and generally available disinfectant for faeces. The chlorine derivatives have a wide range of applicability, both in public health work in water sterilisation and in surgery. Corrosive sublimate is a most powerful germicide, but is too dangerous for use in public health work. Many of the coal tar products so much advertised on the market are merely deodorants, some of them do not emulsify with saline, and this group of antiseptics tend in general to have an over-rated value. Major Stewart's comments upon

preparation of the patient, bromides and morphia, and a gentle compressive bandage in such threatened cases. Major R. M. Dickson records the failure of a modified Barraquer apparatus where the vacuum was produced by mercury.

Major R. E. Wright, dealing with Barraquer's apparatus, records a complete success rate of 80 per cent on 250 cases, whereas the figures for the ordinary Madras capsulotomy operation in 1922 were 1,124 operated on with 88 per cent. of complete successes, and a vitreous escape rate of only 18 per cent. He regards any eye in which there has been any vitreous loss as an eye potentially lost, trauma to the posterior capsule is followed by invasion of the vitreous by proliferative types of cells, and a study of results with Gullstrand's slit lamp and the corneal microscope in such cases shews this invasion.

The same author records the Madras figures for 1922 with regard to glaucoma, where 4 out of 15 cases blind for six months or more regained perception of light. At Madras it is now customary to exclude from operation all cases where infective conditions of the eyeball are traceable. S. K. Ganguly records a case of acute glaucoma in a student supervening upon an instillation of cocaine.

In trachoma D. D. Kapur advocates excision of the fornix, and H. R. Wadhvani a full operation under anaesthesia, expression with Knapp's roller forceps, vigorous use of copper sulphate stick—being careful to avoid the cornea—argyrol instillations and boracic lotion irrigations.

Lt-Col E. A. R. Newman comments on the value of Berger's stereoscopic lenses in eye work, and Major H. C. Craggs, I.M.D., points out that such instruments as the binocular "handlupes" and corneal microscopes have been in use at Madras for some ten years. With regard to *Optic atrophy* Major Wright analyses the chief causes, which he classifies into (1), post-neuritic, of which syphilis is the most common cause, (2) secondary to glaucoma, (3) of renal origin, especially in chronic interstitial nephritis, (4) in the albuminuria of pregnancy, (5) toxic and retro-bulbar, as with the use of tobacco, methyl alcohol, lead, quinine, etc., (6) due to cerebral tumour, (7) those with associated disease of the nasal or accessory sinuses and the teeth, and (8), the special types associated with the meningitic infections of childhood. The importance of syphilis in eye work, and especially in fundus cases, is enormous.

The same author describes a further second case of infection of the conjunctiva with *Rhinosporidium seberi* and a case of *Cysticercus cellulosae* infection of the sub-conjunctival tissues. Both infections may be commoner than is usually supposed. In keratomalacia he finds feeding with liver juice a useful measure. A most interesting analysis of cases of bilateral enlargement of the lacrymal glands, due to a special type of lymphoid hyperplasia is also given by the same author in his 1922 report.

#### PATHOLOGY, BACTERIOLOGY, VACCINE THERAPY, ETC

The presidential address at the Medical Research Section of the Indian Science Congress, 1922, was read by Major H. W. Acton who outlined the main problems to be faced and the methods necessary to co-ordinate men, munitions and equipment. Lt-Col W. F. Harvey and Capt K. R. K. Ivengar continue their studies on *Vaccine Therapy*. There is no evidence that by increasing the dose given of an old vaccine the practitioner can make up for the loss of antigenic properties due to age, exposure to high temperatures, etc., of a vaccine. On studying the development of immunity in pigeons immunised with a *B. avisepticus* vaccine, there is little evidence of immunity up to seven days after the first inoculation but after the second inoculation the immunity rises rapidly and reaches its maximum at the 14th day, remaining at this level until the 30th day. The curves for true immunity and for agglutinin production are very different. Duration of protection lasts at a

high level for some three months, but is almost lost five months later. Vaccines kept at temperatures of from 18 to 37°C for one month shewed no deterioration. A dose of even a dead antigen may prove undesirably toxic, and for each vaccine it is desirable to determine the relationship of the optimum dose for maximal protection to the toxic dose, as either too much or too little may fail to give true immunisation. Immunisation with relatively avirulent living organisms may give complete immunity with doses very much smaller than the lowest optimum prophylactic dose of dead vaccine, and immunisation with such living, avirulent strains will restore an immunity, originally due to injection of a dead vaccine, but subsequently lost.

The King Institute, Gundy, Madras, has made a gallant effort, by sending out circulars to doctors to whom autogenous vaccines were supplied, to assess the results obtained, but without success. Capt R. H. Malone describes a modified opacity method of standardisation dependent upon the solubility of the micro-organisms concerned in bile solutions.

A. C. Vardon describes the preparation of desiccated nutrient media, and Dr M. B. Soparkar comments on the value of heated, as against unheated, blood in the preparation of media for Pfeiffer's bacillus. Blood heated for 10 to 15 minutes at 67 to 70°C and added to the media gave the most luxuriant growth. J. N. Lal describes how media may be re-used. Trypsin should be added and the whole then autoclaved for an hour at 120°C. The same author has also tested the effect of exposure to tropical sunlight on sealed cultures. Direct sunlight was found to be very lethal, but storage in a dark cupboard at room temperature less so. The cholera vibrio proved far more susceptible than did such organisms as the typhosus, Shiga and Flexner bacilli and staphylococci.

Dr C. G. Pandit has studied the Neisser-Wechsberg phenomenon. This phenomenon of inhibition occurs with hæmolytic as well as with bacteriolytic sera. It develops early in immunisation and tends to disappear as immunisation proceeds. It is not due to the action of any of the known antibodies produced, but probably to dissociation of the antigen-antibody complex, and the effect is specific.

dispensary was accused of negligence with respect to a death under somewhat peculiar circumstances. He had given an intravenous injection of one of the salvarsan derivatives to a patient in hospital, two hours later the patient unexpectedly died, and he removed the body and handed it over to the relatives. The death was not certified as apparently no such certification of deaths occurring in hospital was necessary by law. A post-mortem held three days after death, disclosed the fact that gas was present in the right side of the heart and pulmonary artery and a second medical man, who carried out the examination attributed death to air embolism. Obviously however, under the circumstances, this charge could not be sustained, and the defendant was discharged.

In the annual 1922 report of Major T. C. Boyd as Chemical Examiner Bengal, attention is drawn to the very common custom of adulterating country liquor with aconite. This increases the patient's thirst and his consumption but may prove fatal. The poisons most commonly used are arsenic, aconite and yellow oleander, and S. Banerjee gives a full and interesting case-history of a case in which the last was used homicidally. Major C. Newcomb, Chemical Examiner, Madras, describes new tests for madar and the porphyrin test for morphine. In the case of a girl of 10 poisoned by nuxvomica juice, the stomach contents failed to shew strychnine and brucine, whereas they were abundantly present in the leaves consumed, indicating the possibility that in such cases the alkaloids concerned may be completely absorbed into the viscera without leaving traces in the stomach contents. He also gives details of a modified Florence's test for seminal stains which has given reliable results in Madras.

**Entomology.**—The pages of our learned contemporary the *Indian Journal of Medical Research* have been filled with entomological papers—17 in number,—which defy analysis to the ordinary medical man. Here there is a whole wealth of material with direct or indirect bearing upon medical problems. Mr P. I. Barraud, FRS FZS gives a revision of the Indian culicine mosquitoes and Major I. A. Sinton, a description of Indian sandflies—a subject upon which fuller knowledge is urgently needed. The bed bug is the subject of two papers. Lt. Col. J. W. Cornwall dealing with its salivary glands and sucking apparatus, and Major F. W. Cragg with its bionomics, with special reference to the relationships of the sexes. Colonel Cornwall also describes the salivary pump structures in blood sucking and in non-blood-sucking insects and Lt. Col. S. R. Christophers deals with the genital organs and their development in the mosquito. Major R. E. Wright gives an account of a further case of infection of the frontal sinuses with myiasis, the patient was a child aged one year and the infecting agent larvæ of *Chrysomya bezziana*. Mr R. Senior White raises interesting questions with reference to the "eye-fly" *Siphunculina fumicola*—(an insect very prevalent in Assam during the rains and suspected of possibly transmitting epidemic conjunctivitis and Naga sore),—and shews that, although not a true biting insect in the full sense of the term it can yet pierce the dried up surface of a pre-existing ulcer and possibly convey infection passively.

#### SERVICE NOTES

The visit of the Royal Commission on the superior Civil Services in India is a matter of present and extreme interest. Whether the result of such deliberations will be to end or to mend the Indian Medical Service remains to be seen.

During the year, the Secretary of State in accordance with the Devolution Rules, sanctioned the reservation of a certain fixed number of appointments in the various Provinces, and under the Foreign and Political Department and the Government of India, for officers of the I. M. S.

The rules under which officers of the I. M. S. obtain study leave were revised during the year. Officers in

civil employ proceeding on leave under the Fundamental Rules can now convert their leave on full average salary *plus* lodging allowance for the period in question.

The appointment of Director of Medical Services in India, Army Headquarters, has been thrown open to the Indian Medical Service. Under the new orders the appointment will be filled alternately by officers of the I. M. S. and of the R. A. M. C. Major-General Bowle Evans was the first I. M. S. officer to be appointed as D. M. S. India, under the revised procedure. Unfortunately his health broke down after a short period of office and he has been compelled to proceed on leave pending retirement.

The death of Major-General Sir William Rice Edwards, KCB, KCIE CB, CMG MD, FRCSE, KH D, late Director General, Indian Medical Service is reported with deep regret. Major-General Edwards had been appointed to be the representative of the Government of India on the International Sanitary Convention.

The extent to which the cadre of the I. M. S. is being depleted is indicated in the following statement for 1923,—which is complete only to the 30th November, 1923 and which does not stand for a full calendar year—

**Losses by death.**—Lt. Col. I. A. C. Mathews and I. C. Robertson. Major S. C. Chuckerbutty. Capts. A. B. Pecton, C. C. Ittycheria and B. Jones. Lieut. H. Summers.

**Resigned.**—Capts. L. W. Mann and O. Wilson. Lieut. H. McNair also many officers with temporary commissions.

**Retired.**—Major Generals Sir W. R. Edwards, Sir C. C. Manifold and I. B. Smith. Col. H. F. Cleveland, R. G. Turner, H. Austin Smith, P. F. Chapman. Lt. Col. F. C. Macleod, F. H. B. Stanley, B. R. Chatterton, I. A. R. Newman, S. H. Lee Abbott, H. D. Peile, N. R. J. Rainer, C. E. Williams, W. J. Niblock, R. K. Mitter, W. H. Dickinson, S. H. Burnett, J. Penny and D. M. Davidson. Bvt. Lt. Col. R. S. Kennedy. Majors E. C. Taylor, N. H. Hume, A. C. Ingram, C. C. C. Shaw, D. M. C. Church, H. S. Hutchison, J. Smalley and G. Tate.

In an ordinary year a loss of 40 to 45 officers from the permanent service cadre would have been replaced by a similar number of entrants. But as is well known at present the permanent cadre is very markedly below strength new entrants are few and scarce and it would appear with regard to the Indian Medical Service that the chief problem facing the Public Services Commission is not to lay down any fixed proportion of European to Indian officers recruited, but to devise means to obtain recruits in sufficient number of good status of either nationality.

R. KNOWLES

## Current Topics

### Progress in X-rays and Electro-Therapy, 1923

In response to a request for information with regard to the progress of X-rays and electro-therapy in India in 1923, Lt. Col. A. C. Walters, I. M. S., Superintendent of the X-Ray Institute at Dehra Dun sends us the following notes, which are so authoritative and of such specialised value that we reproduce them separately and apart from the general review of the Indian medical year, 1923.

"In connection with X-ray work and electro-therapy, the principal activities of the past year have centred round the employment of high tension transformers for radiography, of efficient protection against X-ray injury, and specialised apparatus for deep therapy.



"Small high tension transformers, operating on any alternating current from 75 volts to 220 volts have been examined. The transformers are oil immersed, and usually contain in the same containing vessel a small step down or auto-transformer for heating the filament of the Coolidge tube.

"Formerly the 10 M. A. type of Coolidge tube was employed. But latterly a tube of similar type operating up to 30 M. A. has been in general use. These tubes, so long as they are worked within the prescribed limits, are capable of suppressing one phase of the alternating high tension current and utilising the other. The amount of energy produced by the transformer is, therefore, reduced by one half. But these sets have been found to give excellent radiographic results.

"In difficult cases, such as abdominal examinations of stout patients, one or two intensifying screens have been employed. The modern intensifying screens, especially those produced by the Patterson Company of America are entirely free from grain, and shorten the exposure to about 1/5th of the normal for each screen used. The Superintendent has carried out a number of tests in connection with the use of both single and double intensifying screens.

"The Eastman duplitised film has been found to give an acceleration when used with two first class screens, which reduces the proper exposure to about 1/4th of the normal exposure of a plate when no screen is employed. A single screen with a good X-ray plate such as the Ilford or Wratten & Wainright reduces the exposure to about 1/4th. Duplitised films are very satisfactory if carefully developed in small tanks specially arranged for the purpose. But any contact of the wet film with the developing tank, or otherwise, is liable to produce scratches and markings which are most undesirable in an X-ray negative. The experience gained here seems to show that provided these films are developed by careful and competent operators the results produced are most satisfactory. But the development cannot be entrusted to ordinary dark room attendants. If there is any carelessness during the process of development the resulting negative will not only be valueless, but will be liable to be extremely misleading.

"A special plate has been placed on the market recently, and has been examined at the X-ray Institute. The makers of the plate claimed that by covering the ordinary photographic emulsion with an intensifying film they would not only produce the intensifying effect of the ordinary accelerating screens, but, by securing better contact, they would produce clearer definition, that the intensifying film could be easily removed before development of the negative was begun. A number of these plates have been examined, but it has been found impossible to remove the intensifying film completely without damage to the emulsion. The makers' claims were so insistent, and the idea so attractive, that a number of experiments were carried out before a decision was finally arrived at. It was found that the intensifying film could not be satisfactorily removed, no matter what steps were taken to facilitate this operation, and it is now understood that the makers have been unable to establish their original claims, and that the plate, at any rate in its original form, has been withdrawn from the market.

"The importance of efficient protection against X-ray injury has been emphasised by the danger which follows the use of Coolidge tubes with high powered apparatus. Formerly 100 kilo volts was regarded as about the maximum effective voltage at the tube terminals, but recently very much higher voltage has been employed, with the result that X-rays of very high penetration have been produced. Protective apparatus which was satisfactory with the lower powered sets, has been found quite insufficient when used with modern high powered installations. The well ventilated and well lighted cubicle system has been used for deep therapy applications with very satisfactory results. A number of samples of protective rubber

and protective glass have been examined. Different samples differ widely in protective value, but the following figures may be taken as representing the equivalent values with ordinarily a fair margin of safety —

1 M. M. sheet lead is equivalent to 4 M. M. protective rubber and is equivalent to 8 M. M. protective glass.

"The ease with which all rubber preparations perish in a tropical climate must always be borne in mind, and if lead rubber protection is employed, frequent tests for efficiency must be carried out.

"The application of deep therapy in accordance with the methods of the Erlangen school is still in the experimental stage in India. Cases of uterine fibroid have been treated with most satisfactory results. Cases of malignant disease have been under observation and the results achieved will be recorded in due course.

"Some improvements in the design of diathermy instruments have been carried out during the past year. The spark gap has always represented the principal source of difficulty with these instruments. A spark gap which is easily adjustable, and which requires only a small quantity of rectified spirit, instead of the coal gas or hydrogen dielectric of former times, has been experimented with. This instrument has proved very satisfactory in operation, and only requires opening up and cleaning about once a week. Diathermy application has been successfully applied in a large number of cases, and when instruments capable of producing higher output are available, the field of usefulness is likely to be considerably enlarged. The Superintendent has experimented with an interrupted low tension galvanic current with very satisfactory results. The current is obtained by employing the ordinary A. C. main. This current is passed through a highly exhausted bulb of special construction, which reduces the voltage considerably, and suppresses one phase of the alternating supply. The resulting current is a pulsating unidirectional current of comparatively low voltage, which is applied after interposing suitable resistance, by means either of pads or by the Schnee's bath. It has the advantage of producing powerful contractions, powerful local stimulation, and being entirely free from painful sensations."

### Some Rare Diseases of the Skin in the Tropics

At a meeting on October 10, 1923, of the Medical Section of the Asiatic Society of Bengal, Major H. W. Acton, I. M. S. read a paper on "Some Rare Diseases of the Skin in the Tropics."

These he divided into (a) congenital or hereditary, and (b) acquired.

The congenital diseases dealt with were —

(1) *Von Recklinghausen's disease*, characterised by (a) multiple tumours under the skin,—molluscum fibrosum (b) tumours on nerve trunks, and (c) pigmented patches—usually on the back. The presence of any two established the diagnosis. One case had shewn very marked improvement when treated with fibrolysin. Dermatology, or elastic skin, was an analogous condition, where there was a condition of diffuse fibroma, hypertrophy, and the skin hangs in pendulous folds and a remarkable photograph of an old woman suffering from this disease was shewn. It chiefly affects the face, neck and the back of the scalp and is usually incorrectly diagnosed as "elephantiasis." It also shews a hereditary tendency, and the old woman's son was affected with von Recklinghausen's disease and shewed numerous fibromata and neuro-fibromata.

(2) *Adenoma sebaceum*, a symmetrical affection of the face, chiefly involving the naso-labial sulci, the root of the nose and the forehead. It was often congenital or began early in life, and persisted throughout life. There were three types—(a) Balzer's type, where the lesions are pale and involve the sebaceous glands, (b) Pringle's type, where the lesions are pink, sebaceous, and accompanied by vascular

hypertrophy, and (c) Hallopeau's type where the lesions are warty, and affect the sebaceous and sweat glands and hair follicles and there is hypertrophy.

(3) *Tricho-epithelioma*, a symmetrical affection of the face, usually affecting the eyelids, forehead, cheek and chin sometimes however the ears, and more rarely the breasts, anus, and the skin between the scapulae. The tumours vary in size from that of a pin's head

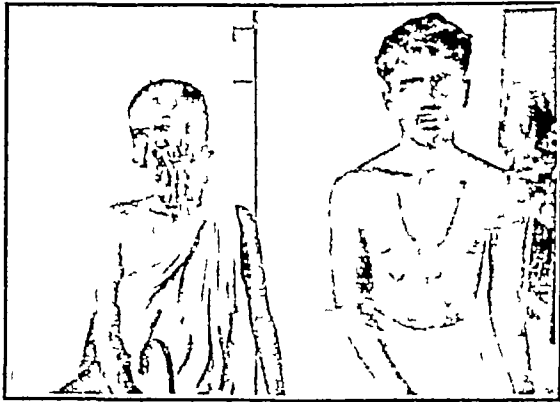


Photo 1—*Dermatolysis* of the face. The mother shows fibrous tumours in the skin and nerves whilst the son is a typical case of von Recklinghausen's disease.

to that of a pea, are whitish, bluish, yellow or pearly in appearance, and on section shew microscopically solid masses of epithelium derived from the rete mucosum and external layer of the hair follicles. This disease is often congenital.

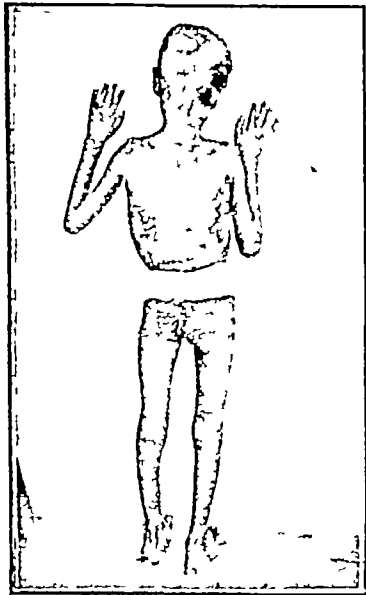


Photo 2—*Epidermolysis bullosa*—the disease appeared in infancy—the bullae form at any point of pressure *viz*—most marked at the back of the head back and sacrum

(4) *Xeroderma pigmentosum* which does not appear to be hereditary, as the patients rarely survive up to the age of puberty. It commences with freckles and moles, consisting of melanoblasts and angioblasts. These become warty and bleed,—the herald sign of malignant change. They develop into melanotic sarcomata sometimes, more commonly into endotheliomata.

(5) *Epidermolysis bullosa*, usually hereditary. This does not involve the general health, but starts early in life. The patient's skin all over the body becomes so



Photo 3—*Mycosis fungoides*—in an albino—the dark patches are freckles, whilst the fungating lesion is best seen on the left shoulder

affected that vesicles and blebs form at any spot subjected to pressure, and are chiefly seen on the finger tips, the wrists, around the neck where the collar band rests, the sacrum, the back of the head, etc. A very



Photo 4—*Mycosis fungoides* in a leper—the mycotic lesions are seen on the body as deep crateriform ulcers the lepra granulomata are seen on the face and ears

striking photograph of a case was shewn. Two factors are concerned in the disease, congenital irritability of the vascular supply to the skin and loss of elastic tissue.





arm To laxity of supervision by the Philippine staff after the departure of the Americans is assigned a sudden rise in the small-pox mortality Cunningham and Cruickshank's method of testing vaccine lymph is described An illustrated description of Liston and Gore's hydrocyanic acid fumigation for ships is given Reports from the Chief Medical Officer of Health, Bombay indicate the enormous importance of room overcrowding in producing infantile mortality Over 90 per cent occurs in families living in one room or less The neglect of centuries' malaria and trachoma are the greatest problems of Palestine In Fiji, pupal flies are attacked by a wasp-like insect and it is proposed to utilise this for fly destruction Reports from French colonies indicate that there is a growing tendency amongst the natives either to go to hospital or to send for qualified assistance at child-birth

The Editor of the *Bulletin* is apprehensive that detailed card index systems of school inspection in India on European lines may be too top heavy until teachers are properly paid the school rooms properly ventilated and suitable latrine accommodation provided

### Postural Treatment in Lung Disease, *Brit. Med. J.* 5th May, 1923, p 7359

DURING the war Dr Aitken had charge of the tuberculous ward in a native hospital Having read of cavities being emptied by posturing, he tilted up the foot of the bed in one case The ward master noted that not only was the patient better, but that he coughed much less, and asked if he might try posturing in all cases with cough This was done, the bottles of sedative cough mixture lay untouched, and the ward was quiet in place of being disturbed by a cough here and a cough there as before

In another hospital a European who had lain for weeks in bed with a running temperature and signs in the lung of phthisis, was tilted up, and immediately his temperature fell and kept normal He was going to be discharged, when the temperature rose suddenly His bed was tilted, and soon after the temperature fell The tilting was carried out in three-hour stages for a week, and a week later as he felt well he left the hospital and the author lost trace of him

The patients liked the treatment and would ask to have their beds tilted The author suggests this treatment in private practice, but an objection raised is that the bed may break

### The Standard Treatment for Malaria

In the *New York Medical Journal and Medical Record*, June 20 1923, Bass discusses the efficacy of the treatment with which his name is associated, this is the standard treatment for malaria "For the acute attack 10 gr of quinine sulphate by the mouth three times a day for a period of at least three or four days to be followed by 10 gr every night before retiring for a period of eight weeks For infected persons not having acute symptoms at the time, only the eight weeks treatment is required" Special search has been made for cases in which the treatment failed Up to the present time not a single case has been found in which fever or chills and fever due to malaria have continued for four days when the patient was taking as much as 30 gr of quinine daily

During the past year a further effort has been made to find these so-called resistant cases of malaria by keeping in touch with the cases of malaria in the large hospitals of New Orleans The date on which the patient began taking quinine and the amount taken were recorded Any case in which the patient was given as much as 30 gr of quinine daily and in which the temperature rose above normal on or after the third day was reported for personal investigation Thus far, only four cases have required investigation

In one of these tertian parasites had been found and confirmed three days previously 30 gr of quinine

sulphate had been given daily for four days and the patient had a temperature of 104°F Investigation revealed some delirium, rose spots on the abdomen, a positive Widal reaction, and typhoid bacilli grew in the blood culture

In two other cases it was found upon investigation that the nurse had recorded the quinine as being given, but one patient had actually received only one dose of 10 gr and the other patient only two doses at the time of investigation of the supposed failure of the treatment They were then given 30-gr of quinine daily and the temperature did not rise above normal in either of the cases

The fourth case was one in which the diagnosis was made on one doubtful parasite found in one of many blood examinations The patient continued to have irregular chills and fever for several weeks although she was given as much as 50 to 60 grs of quinine daily for several days at a time The chills and fever finally stopped without a diagnosis being made. It was not malaria

Bass concludes that so far as his own experience and observations go the standard treatment is 100 per cent effective in controlling the clinical symptoms of malaria The question of absolute cure is not discussed only that of relief of symptoms (*Jour of Trop Med & Hygiene* Aug 15, 1923, p 270)

### The Wellcome Bureau of Scientific Research

MANY of our readers will read with interest the following announcement which reached us by the home mail of the 7th of September, 1923 —

'Dr Andrew Balfour, C.B. C.M.G., F.R.C.P.E., for the past ten years Director-in-Chief of the Wellcome Bureau of Scientific Research, London, resigns that position on October 31st 1923 Subsequent to this date his address will be c/o Royal Society of Tropical Medicine and Hygiene 11 Chandos Street Cavendish Square, London W 1

He will be succeeded by Dr C M Wenyon, C.M.G. C.B.E. M.B. B.Sc. who for the past nine years has been Director of Research in the Tropics at the Wellcome Bureau of Scientific Research, and has now been appointed Director-in-Chief of that Institution."

Dr Balfour's excellent work at the Khartoum Institute was succeeded by his even more vigorous work at the London Bureau Under his direction that Bureau has collected together a museum of tropical diseases which is an education in itself whilst the *Tropical Diseases Bulletin* published monthly, together with its quarterly *Sanitation Supplements*, has become a journal which no medical man practising in the tropics can possibly afford to be without, since nowhere else can he obtain a connected resume of all the more important advances in tropical medicine and hygiene put together in small compass and so indexed as to afford easy reference We trust that Dr Balfour's resignation is but the prelude to his appointment to an even more important post\*

No person could possibly be more suitable than Dr Wenyon to succeed Dr Balfour His work in tropical medicine and especially during the war has rightly earned for him a world-wide reputation, and his selection represents that of the right man for the right appointment—a principle too often ignored in official matters

We trust that such of our readers as go home on leave and have occasion to pass through London will not neglect to visit the Wellcome Bureau at 25-27, Endsleigh

\*As we go to the press we hear the gratifying news that Dr Balfour has been appointed Director of the new School of Hygiene in London

We heartily congratulate Dr Balfour on this well deserved appointment The School is indeed fortunate having secured so capable a pilot

Gardens, Gordon Square, N W 1 Those who go through the museum will find in it a wealth of instructive information splendidly arranged, whilst it is of great importance for the medical profession in India to keep in touch with the body of workers at home upon tropical diseases, and mutual interchange of views and of experience is always helpful

### A One-Day Treatment for Scabies.

In the April 1923 number of the *Journal of the Naval Medical Service*, p 146, Surgeon Captain J F Hall describes a one-day treatment of scabies, modified from a method in use in the Danish Navy The technique is as follows—

(1) 2½ lb of sulphur sublim, are dissolved at a gentle heat in 5 lb of an aqueous solution of caustic soda containing 1½ lb of this alkali This makes a clear solution

(2) 4½ lb of vaseline and 4½ lb of anhydrous lanoline are carefully mixed in a warm mortar, and to this mixture the 7½ lb of sulphur solution in soda lye are added

(3) Fresh zinc hydroxide is prepared by mixing 9 oz of zinc sulphate and 12½ oz of a 20 per cent solution of caustic soda, this is afterwards added to the ointment, which is then made up to a total weight of 20 lb by the addition of liq paraffin

(4) About 3 drms of essential oil of almonds are added to disguise the odour

**Method of Application**—The patient has a thorough hot bath, dries himself, and rubs the ointment well into the affected parts and their neighbourhood, if the back is affected this is rubbed by an assistant The patient then stands with his body exposed for fifteen minutes to allow of the escape of the sulphuretted hydrogen which is generated by the application of the ointment to the skin He then puts on a shirt or pyjamas and goes to bed, where he remains for twenty-four hours, then he has another bath, puts on clean clothes, and he is cured

In none of the author's cases has any dermatitis developed, or any ill effects been seen from the sulphuretted hydrogen, and there have been no relapses when the treatment has been thoroughly carried out, though hard rubbing is not necessary

In any of H M ships fitted with a sterilizer capable of disinfecting clothing and bedding this treatment can be easily carried out and so save the necessity of sending cases of scabies to hospital

This ointment keeps well

### Epilepsy and Luminal.

In an article on Recent Work on Nervous Diseases in the April 1923 Number of the *Practitioner* Dr Campbell Thomson discusses the treatment of epilepsy by luminal He refers to the results of treatment in 125 cases, observed over periods of not less than eighteen months All these patients had previously been treated with bromides over periods varying from fourteen years to six months, and, as it is well known that omission of bromides is sometimes followed by temporary improvement the treatment was suspended for a time before the luminal was given That improvement could not, however, be attributed to omission of bromides in these cases was clearly shown by the fact that in only one instance was there a period of remission after omission of bromides, and that remission lasted only for sixteen days Two cases showed no alteration when the bromides were omitted and in all the others the malady became more severe

A study of the results showed that out of the total number of 125 cases 36 were either not improved or deteriorated under the treatment whilst the remainder did better with luminal than with bromide The patients who showed most improvement were those in whom the fits occurred at frequent intervals while the least affected were those in whom the attacks occurred in bouts at considerable intervals of time

According to Dr Golla, luminal may be found to be particularly useful in a class of case which does not respond to bromide

It was found that, as a rule, the drug was well tolerated, and most patients found they were brighter and more cheerful after changing the bromide for the luminal In twelve instances, however, there were complaints of giddiness and drowsiness, and five of these twelve developed a slightly reeling gait By diminishing the dose toleration was obtained in all except four patients, who complained so persistently of giddiness that the treatment was stopped

There was in no case any sign of development of a drug habit, and suspension of treatment did not give rise to any disturbance

The usual dose given is from ½ to 1 grain night and morning, or a single dose of 1 or 2 grains can be given at night When larger amounts are given it is advisable to keep the patients under frequent observation

**Luminal in Migraine**—The successful treatment with luminal of some cases of epilepsy which do not respond to bromides led Dr Wilfred Harris to try the effects of the drug on patients subject to obstinate and frequent attacks of migraine, with the result that both the frequency and the severity of the attacks were greatly reduced Dr Harris recommends that, as a rule, the dose should not be more than three-quarters of a grain three times a day If the result is beneficial, this amount need not be increased, but after a fortnight it may be reduced to twice daily, and later on to one dose daily taken at bed-time

## Reviews.

**ADDRESSES AND PAPERS.—Dedication Ceremonies and Medical Conference, Peking Union Medical College, September 15th to 22nd, 1921. Rumford Press, Concord, New Hampshire. Pp. 416.**

THE medical worker in India into whose hands this lavishly illustrated and sumptuously published collection of addresses and papers falls may well rub his eyes This is medical education as it ought to be endowed, not as it is left to struggle with parsimonious grants and exiguous means in the "land of regrets" The interest of the Rockefeller Foundation in China dates from 1908, when the first commission was sent out from the University of Chicago to report to the parent foundation in New York The report of a second commission in 1914 was followed by the establishment of the China Medical Board in 1915, and a third commission recommended the establishment of two medical schools and the encouragement of medical education in China as the most hopeful line of policy to be pursued It was felt that, whilst the numerous and well organised missionary and private hospitals afforded every facility for medical work and study of the highest order, the supply of Chinese medical men with the requisitely high degree of training was inadequate

The Union Medical College was first established by the activities of the London Missionary Society and other kindred organisations in 1906 The present group of new buildings cover 226 acres and consist of 14 separate buildings the illustrations in this volume alone conveying to the reader how admirably thorough and fully up-to-date is the construction and equipment throughout Pre-graduate, post-graduate and short term revision classes are fully provided for and in an opening address by Mr John D Rockefeller, Jnr, the reader will find a splendid account of the ideals and the aims of the institution "it is the desire of the Peking Union Medical College to offer to the people of China the best that is known to Western civilization not only in medical science but also in mental development and spiritual culture ... Rome

was not built in a day, nor can the ideals which animated the founders of the College be realised in a day or a year or a decade. The most stable and enduring structure is that which is built on deep and broad foundations. Gradual growth alone gives assurance of stability and permanence.

When men of the requisite calibre are each year being graduated from the college to spread abroad throughout this great land the healing of the body and the inspiration of the soul of the Chinese people, the spirit of service and of sacrifice in which this institution was conceived will have been immortalised, and one of the chief purposes for which the college was founded will have been realised. The medical worker in India, envious though he may well be of such opportunities and such splendid facilities, will welcome this splendid addition to the medical education institutions of the East.

In addition to opening addresses, however, the volume contains the papers read at the subsequent medical conference which lasted for a week. Here there is much of special interest and importance to the Indian worker. Dr Hume's account of medical education in China, "a survey and a forecast," will find many an echo in India. "Chemistry facilities are scanty, there is no proper apparatus for teaching physiology, 3,000 physicians minister to the needs of a population of not less than 360,000,000 not by increasing the number of dispensaries where the foreigner can treat the sick himself will China be benefited, but by an increased effort to train Chinese physicians, men and women, themselves to minister to their fellow-countrymen and women—the first issue is sufficient staff and funds, the second that of sufficiently high standards."

The future of medicine must be in Chinese hands only schools with high professional standards should be countenanced.

Of many excellent papers Dr A. B. Macallum's "Biochemistry in Retrospect and Prospect" adumbrates the future hopes of this new yet immensely important branch of medicine and shews the splendid facilities for its study provided at Peking. Dr S. S. Goldwater's address on "The Ideal in Hospital Organisation" is one of special interest to Indian workers. Dr Victor G. Heiser in an admirable address explains how anti-hookworm campaigns help to arouse a sanitary conscience and an interest in public health measures among an Eastern population. The anti-hookworm campaigns of the Rockefeller Foundation do not merely aim at eradicating hookworm infection; they succeed in arousing popular interest in general measures of public health.

A fully illustrated and exceptionally interesting paper is that by Dr G. E. de Schweinitz on "The Evolution of some of the Visual Phenomena of Pituitary Body Disorders." 45 per cent. of patients had practically or entirely lost the sight of one eye before the true nature of the lesions was identified. Dr Wu Lien Teh deals with epidemic plague as it occurs in Manchuria, giving a full account of the history of the disease in Manchuria, and laying special emphasis on human carriers, i.e., apparently healthy persons who harbour *B. pestis* in their sputa. He failed to find natural infection in marmots, but succeeded in infecting them by inhalation of sprayed cultures. Pneumonic epidemics he considers to be secondary manifestations of bubonic plague, whilst the prevalence of septicæmic cases is often noted towards the termination of an epidemic. Disinfectants for use on infective sputa have disappointing results, and the mask was found to be the best means of personal protection.

A paper by Dr Florence R. Sabin on "The Origin of the Blood Cells" is one of interest to all pathologists, whilst Dr Sahachiro Hata deals with "The Present Status and Future Problems of Chemotherapy," a paper which will command general interest because of its authoritative character. In the clinical section short symposia on kala-azar, sprue and tuberculosis as they occur in China deserve attention. Sir William Smyly,

as visitor to the conference, gave an address on "Eclampsia and Eclampsism," dealing with theories as to its causation and the Rotunda methods of treatment. "Aspects of Parasitology in the Philippines" by Dr Frank G. Haughwout is a paper which should be read by all laboratory workers, whilst other important papers deal with problems in obstetrics, tetanus as met with in the East—with special reference to the possible occurrence of the *B. tetani* in the intestinal tract,—ophthalmology, neurology and operative surgery.

The whole volume is one which will be read with the greatest interest by medical workers in India. Whilst we envy China the new College, we cannot but feel that its importance and value in the ever widening domain of tropical medicine will become more and more felt as its activities expand with its ever growing programme.

**FUCH'S TEXT BOOK OF OPHTHALMOLOGY, 7th, 1923 Edition. Published by the Lippincott Co., Philadelphia and London. Obtainable from Messrs Butterworth & Co., Calcutta 997 pp Price, Rs 36-12-0.**

THIS is the seventh edition of an old and favourite text book, and although changed a good deal, maintains the high standard of previous editions. It is now based on the 13th German edition, for which Professor Salzmann is responsible, but the translator, Dr A. Duane, has done a lot of re-arrangement and interpolation, including the whole chapter on motor anomalies of the eyes, which render this volume much more than a mere translation of the German book. As in the previous edition the notes thus interpolated are very valuable and represent up-to-date English and American practice.

The most marked change in the new edition is its radical re-arrangement, the book starting with a systematic account of the anatomy and physiology of the eye followed by a short account of the etiology, symptomatology, and general therapeutics of eye diseases, refraction in theory and practice, the general examination of the eye, and determination of sensory and motor defects,—this occupying 364 out of 950 pages, and furnishing a very sound basis for the detailed study of diseases in the different regions of the eye which occupy the next 550 pages.

The last 110 pages of the book are devoted to operative procedures, and this part, which used to be the weakest in the book, is now quite good and contains a useful account of modern operative procedures, especially those which deal with the lids and socket and those for glaucoma.

Former editions were weak in the brief accounts which they gave of treatment, operative and otherwise, whilst good as regards pathology and diagnosis, and this edition, whilst very carefully altered and up-to-date in these last is much more evenly balanced than before, and the systematic treatment of anatomy and physiology in one section, instead of in a series of scattered paragraphs, is a great improvement.

English work is freely recognised and quoted to a far greater extent than in previous editions, a pleasing change from the pre-war German textbook which was slow to recognise any but German research.

After this note on its contents it is hardly necessary to point out that this volume is one which should find its place in every ophthalmological library.

**AIDS TO OPERATIVE DENTISTRY.—BY J. D. HAMILTON JAMIESON, H. D. D., L. D. S., London: Baillière, Tindall & Cox, 1923 pp 168 Price, 3s. 6d net**

As the author states in his preface the manipulative portion of operative dentistry can only be learnt at the chair side, but in this very useful little book there is much that will be of great use to the dental student.

In many ways it is a résumé of the methods of teaching employed at the Edinburgh Dental School.

The chapter dealing with extraction can be thoroughly recommended and it might even be very useful to medical practitioners who have a certain amount of tooth-extracting to do.

The language employed is simple and the book easily readable.

**DISEASES OF THE SKIN.**—By **ROBERT W. McKENNA, Bailliere, Tindall and Cox., pp. 460, plates 160. Price, 21s. net.**

THIS addition to the existing large number of books on diseases of the skin is written with a special view to the needs of the medical student and the general practitioner.

It is an excellent book and in some respects is an advance on existing textbooks. The illustrations are exceptionally good and the number of prescriptions has been kept within more reasonable limits than is usual in books on skin diseases.

It will be found useful for the advanced student and for the medical man who desires to keep his knowledge up-to-date, but in view of the already overcrowded state of the medical curriculum it is doubtful whether it is not too large for the average student. It is also too small to serve as a book of reference.

A pleasing feature of the book is that its price is moderate as compared with recent textbooks which are equally well illustrated. Evidently the cost of publishing has fallen in a gratifying manner, as of late the cost of English and American textbooks has been excessive but is now obviously coming down.

**THE SURGICAL DISEASES OF CHILDREN. A Handbook for Students and Practitioners.**—By **F. C. PYBUS, M.S., F.R.C.S., Assistant Surgeon, Royal Victoria Infirmary. H. K. Lewis & Co., London, 1922. Pp. 408. Price, 18s.**

THIS book does not claim to be a complete treatise on the subject, but "is rather a record of personal experience of the common conditions met with on the surgical side of a children's hospital." There are many illustrations, mainly photographic.

In our opinion there is a need for expansion, if this book is to become really useful. The information contained in this edition is very little more than can be found in the ordinary surgical textbook. It will be useful for students wishing to make a rapid review of children's surgery before attending the wards of a hospital for sick children.

**DENTAL SURGERY FOR MEDICAL PRACTITIONERS.** By **J. J. MODI, L.M. & S. (Bom.), L.D.S. (Eng.), 1923. Karnatak Printing Press, Bombay. Pp. 199. Price, Rs. 5.**

THIS compact and useful little volume which, as the author states is more a compilation from other books and articles than an original work, should be very helpful to any medical practitioner who desires some general knowledge of dental surgery.

There are one or two small corrections which would be desirable in the opinion of the reviewer. On page 46 the author gives pus as one of the constituents of tartar. It is true that pus and food debris collect round tartar but the latter in the first place is purely a deposit of lime salts from saliva.

On pp 56 and 57 he states that the carbohydrate eating Indians are freer from caries than meat-eating Europeans. This may be true, but it is not the meat portion of European diet that causes caries, but the various other patent and manufactured foods that they eat. On the other hand the tremendous prevalence of pyorrhœa among Indians is largely due to the soft nature of their diet.

On page 62 he advises the use of a hard brush and gritty powder in tooth-cleansing. This is entirely wrong and ought to be avoided. All that is required is a medium brush and if anything in the nature of a cleanser is required, it should be in the form of a paste or mouth wash.

The author also advises medical men to stop short at palliative treatment and leave legitimate dental work to the dental surgeon. This is a very sound idea in places where a dental surgeon is easily available, but as there are so many parts of India many miles from a dental surgeon it is essential that the medical officer should have a knowledge of simple filling of teeth. Lastly with regard to extraction, it is better that any operator should work with as few forceps as possible and it is advisable for him to learn to work with only one pair for the upper jaw and one for the lower, e.g., for the upper, those described by the author for use in extracting upper incisor teeth, and for the lower, those described for use on lower incisor teeth.

With regard to the position of the gag in extraction under nitrous oxide gas, on p 140, the author says that dislocation of a tooth is often due to the gag being placed too far in front of the mouth. There is only one place for the gag and that is right in front of the mouth. It will also be found much easier to extract left lower molars and pre-molars from the left side of the chair.

**THE HOME AND HEALTH IN INDIA AND THE TROPICAL CLIMATES.** By **Dr. KATE PLATT, M.D., B.S. (Lond.) Bailliere, Tindall & Cox, London, 1923. Price, 5s. net. Pp. 216.**

THE author was for many years Principal of the Lady Hardinge College and Hospital at Delhi. This book is especially written for European women who have to make their homes in the tropics.

Dr Platt has successfully embodied her medical knowledge with the results of her observation and experience in India and the book will be found very useful, especially to new comers and should be carefully studied before leaving home. The chapter on the preparation and outfit necessary on proceeding to the tropics seems particularly practical and helpful and should help to avoid many of the mistakes and pitfalls which would appear to be made year after year. A good description of the bungalow, its arrangement and management is given with much helpful advice. If we would make a criticism of this part it would be that the importance of personal supervision is hardly emphasised sufficiently. As the author points out, Indian servants, though extraordinarily good in many ways, do not understand or appreciate European standards of cleanliness, and continuous personal supervision is necessary. Thus it is not enough to advise that under certain circumstances all milk and drinking water should be boiled, the lady of the house must see personally that it is boiled and not only heated, and afterwards it should be carefully protected from all sources of contamination as contaminated boiled milk and water are more dangerous than when unboiled. Also the importance of the cleanliness of *gharans* is not insisted on strongly enough. The giving out of these should be a daily duty and not done at odd intervals. The importance of the care of the mother's health during the pre-natal period is pointed out and much useful advice given, while the young mother will find much valuable help in the chapters devoted to the child's development, its illnesses, their prevention and emergency treatment. The part devoted to tropical diseases is somewhat sketchy but the object of the book perhaps makes this inevitable. Simple descriptions of the ordinary diseases are given with emergency treatment.

The book is of a convenient size, well printed and bound, is written in a good and an interesting style, and we recommend it heartily to those for whom it is written. It should find a place in the household "medical cupboard" along with the others which the author recommends.

## ANNUAL REPORTS.

### THE PASTEUR INSTITUTE OF SOUTHERN INDIA COONOR ANNUAL REPORT FOR THE YEAR ENDING 28TH FEBRUARY 1923, MADRAS SUPERINTENDENT, GOVERNMENT PRINTING

This report, by Lt-Colonel J W Cornwall, M A, M D, D P H, I M S, strikes a new note and heralds a new departure. The total number of patients fully treated at Coonoor during the year was 3,375 or a decrease of 96 on the total for the previous year. The reason was the gradual introduction of the scheme for the issue of antirabic vaccine to Government headquarter hospitals in the Presidency.

[Civil surgeons and harassed practitioners throughout India have for many years clamoured for the distribution of antirabic vaccine in place of having to send patients to selected centres in the hills for the treatment. In Madras at least this is now being experimented with, and, we need hardly add that under so experienced a head of an antirabic institute as Colonel Cornwall, this is being done only tentatively, with all due precautions, and with all necessary controls. Such a policy *must* constitute the first step towards any release of the carbolised vaccine for general use. The whole question, indeed of the future antirabic policy in India demands most careful attention to-day. The gravest doubts have been cast upon the true degree of efficacy of all antirabic vaccination, the public and the Local Governments are demanding that the large sums of money spent upon sending patients to institutes in the hills shall be saved. The public health worker who views matters in true perspective realises that, however dreadful a disease be hydrophobia, it does *not* constitute a disease of any real importance in Indian mortality rates. The medical research worker considers that with the advent of Semple's carbolised vaccine we have reached what must at present constitute at least the safest line of antirabic vaccination whilst the cardinal problem of all remains in the future discovery of the still unknown micro-organism of rabies, knowledge without which our antirabic measures still largely consist of working in the dark. But such a position can be solved only by careful and clear thinking and by very careful investigation and planning. Any measures taken in a hurry will be regretted later, and the time is not ripe for any drastic changes.]

With regard to the patients treated at the Institute the report follows the usual lines. Advice but no treatment was given to 171 persons. There were 25 deaths and a total hydrophobia rate of 0.74 per cent. with a failure rate of only 0.35 per cent.—(12 deaths). With the vaccine issued to Government headquarter hospitals 1,248 persons were treated with a total of 9 deaths, a total death rate of 0.72 per cent, and a failure rate of 0.32 per cent.

The correspondence of these two sets of figures appears to indicate that the treatment is as efficacious, *when properly administered in institutions*, as when used at the parent Pasteur Institute but it is obvious that were the vaccine to be issued broadcast the chief difficulty would be to persuade patients to come daily for the 14 days' injections. Indeed this difficulty has already been experienced at Rangoon and Madras where, amid the surroundings of a city, patients are less amenable to discipline.

It is as yet too soon to pass any verdict upon the results of this most interesting experiment. If the numbers treated at both Coonoor and other institutions be added together then no less than 4,623 patients were treated during the year, an enormous increase on the figure of 3,471 for 1921-22.

Of the other two main features of interest in this report one is the position of jackal bite in the returns, they constitute for the past 15 years only 2.74 per cent of the patients treated at Coonoor, as against some 22 per cent of those treated at Shillong.

["Dog-bite" in India may in fact mean anything, from a lick upon unabraded skin by a non-rabid animal to a severe injury inflicted by an unquestionably rabid animal. Whereas unprovoked jackal bite is almost always indicative of real exposure to the risk of hydrophobia. Hence jackal bite becomes one of the many important points which differentiate the Indian from the European institutes. A second, and even more important is that, since Lt-Colonel W F Harvey first introduced the keeping of accurate statistical details into antirabic work at the Kasauli institute, and Indian institutes commenced to publish not merely failure rates—but only such deaths as occurred later than 15 days after the expiry of treatment—but also the total number of deaths from hydrophobia and probably the only *full and honest statistics* available in the world there has now accumulated in India a mass of statistical information which well deserves detailed and expert scrutiny and analysis. No other country in the world, we believe, can furnish anything of the sort.]

The other important feature in this, as in all the Coonoor reports is its collection of statistics with regard to the mortality from rabies. In the last ten years of 812 persons bitten by undoubtedly rabid animals and treated the total death rate was 2.9 per cent, whereas of 1,362 corresponding persons bitten and not treated the rate was 6.2 per cent. Taking the risk run by persons bitten by undoubtedly rabid and unquestionably infective animals,—(as shown by at least one death from hydrophobia having occurred among each group of persons so bitten),—and Table IV, of 423 persons so bitten 278 remained untreated with 148 deaths, or a hydrophobia mortality of 32.8 per cent. This, of course would seem to shew immediately the immense effect of the treatment in saving life but a word of caution is necessary. Death from hydrophobia after the bite of a rabid animal may occur at any period from the third to the 50th week after bite or even later, but the peak of the curve of frequency is at its maximal about the 6th week or 42nd day after bite. Most of these patients in this table do not come for treatment until the death of one or more of those bitten has alarmed them and most of them again have thus passed the period of maximal risk. Hence the figures as Colonel Cornwall points out are not unselected.

This brief report contains within it much food for careful reflection. The whole antirabic question in India is at present a most difficult one. Fortunately however there are at present at the head of the different antirabic institutes of India a group of careful and very thorough workers who can be trusted to think wisely and to plan well. So far from a universal distribution of the vaccine being resorted to, we consider that the Madras policy of controlled and careful distribution only to headquarter hospitals with a collection of results is the policy which should at present be advocated. In other words we consider that the treatment should at present remain institutional although the necessity for hill-station treatment has long ago gone by the board with the introduction of the carbolised antigen of Sir David Semple.

### KING EDWARD VII MEMORIAL PASTEUR INSTITUTE, SHILLONG ANNUAL REPORT FOR 1922 SHILLONG GOVT PRESS, ASSAM PRICE, 12 ANNAS

DURING 1922 Lt-Colonel F P Mackie, I M S, was Director of the Shillong institute till January 30th. Lieut. E C R Fox, I M B officiated from January 31st to May 15th when Major H E Shortt, I M S took over charge. A total of 1,728 persons completed the course of antirabic treatment, of whom 115 were Europeans. This represents a slight falling off on the 1921 figures, probably owing to the abnormal floods of 1922 when traffic on the E B Ry was closed for nearly a month. There were no deaths from hydrophobia among the European patients and in the case of Indians, the total hydrophobia rate was 0.80 per cent and the failure rate only 0.18 per cent—a very low figure when it is noted that

jackal bites constitute no less than 22 per cent of the cases treated at Shillong 51 per cent of the patients came from Bengal

With regard to research work, Major Shortt notes first on the pathology of acute experimental kala-azar in monkeys Attempts were made to test the infectivity of the faeces and of the drinking water in kala-azar, to find either a vertebrate or invertebrate animal truly susceptible to infection, and to infect animals by the cultural phase of *L. donovani*, by body lice by bed bug excreta, and by the natural herpetomonads of insects As is usual in experimental work on kala-azar, an enormous amount of experimental work led to but few positive results In treatment Major Shortt emphasises the value of urea stibamine, and his results with this compound have already been published in our number for last July The factors which cause the undue prevalence of malaria in Shillong were under investigation, and as published in our September issue—the problem of diphtheria in the European schools in Shillong, which had been a constant menace since 1917, was most successfully dealt with The vaccine section of the institute ceased to manufacture its own supplies during the year and became a distributing centre for vaccines purchased from the Central Research Institute, Kasauli The total cost of running the institute during the financial year 1922-23 was Rs 64,988 of which Rs 7067 was found by public and private subscriptions and the balance from provincial revenues

REPORT OF THE BURMA PASTEUR INSTITUTE, RANGOON, FOR THE YEAR ENDING 31ST MARCH, 1923 BY LT-COLONEL T H GLOSTER, MB DPH, IMS OBTAINABLE FROM THE SUPERINTENDENT, GOVERNMENT PRINTING, BURMA PRICE 8 ANNAS

The Burma Pasteur Institute combines the functions of both an antirabic institution and the provincial bacteriological laboratory During the year 1922-23 the total number of persons who attended was 1,107, an increase of 24 per cent on the figures for the previous year In the case of 42 patients treatment was discontinued when evidence became available that the biting animal was not rabid 421 persons were advised that treatment was not necessary—a fact which very clearly emphasises the large numbers of patients who flock to the Pasteur institutes of India unnecessarily,—and 99 persons voluntarily abandoned treatment The number fully treated, was thus 545

Of these 42 per cent came from outside districts, 16 per cent were bitten by animals proved rabid by laboratory tests and dogs were responsible for biting 675 out of 686 cases at risk There was only one case of jackal bite and this was in a patient from outside Burma Of over 5,000 persons who have come to the Rangoon institute for treatment since 1915 not one has been bitten (in Burma) by a jackal This special freedom from jackal bite—which is responsible for the majority of all cases of hydrophobia in treated patients,—is contrasted with the figures for Kasauli, 17 per cent of 39,914 patients for Shillong, 27.5 per cent of 10,084 cases and for Coonoor 25 per cent of 22,053 cases bitten by rabid jackals Jackals are extremely rare,—if indeed they are present—in Burma and this very important factor in swelling the hydrophobia returns is absent from the Rangoon institute, which accordingly presents figures more akin to those for European institutes than those for Shillong and Kasauli The total death rate for the Rangoon institute in the year under review was 0.41 per cent, and the failure rate 0.22 per cent The reply-paid postcard system of following up the after-history of patients worked fairly well, 554 replies being received out of 614 enquiries sent out On the other hand of 85 persons reported as having been bitten by rabid animals but not treated, the after-histories of 54 could not be traced, 23 were reported as alive and in good health three months after having been bitten, and 8 had died from hydrophobia—figures which

go to still further emphasise the fact that the death rate from hydrophobia among untreated cases is, probably, very much less than is usually supposed to be the case

In the Bacteriological Section there were 3,016 examinations carried out, an increase of 28 per cent on the previous year 450 autogenous vaccines were prepared The issue of antisera from stock in cold storage shewed a considerable increase over the previous year Lt-Colonel J C G Kunhardt, IMS, conducted an enquiry into the causes of the prevalence of enteric fever in Insein Jail Lt-Colonel T H Gloster, MB, DPH, IMS was Director throughout the year, Lt-Colonel J C G Kunhardt, IMS acted as Assistant Director until the 25th March 1923, and Major J Taylor, DSO, MD, DPH, IMS subsequently Military Assistant Surgeon G H Blaker, IMB, was Assistant to the Director, Mr P N Rao Naidu, bacteriological assistant, and Drs K. N. Menon, IMI, and J Venkataramana Naidu, IMI, were also on the staff

REPORT ON THE PUBLIC HEALTH ADMINISTRATION OF BURMA FOR 1922, RANGOON SUPERINTENDENT GOVT PRINTING, BURMA 78 pp PRICE Re 1-12

DURING the year the post of Director of Public Health, Burma, was held by Lt-Colonel C E Williams, IMS, whose retirement after 15 years of most strenuous work for the promotion of the physical well-being of the people of Burma is deplored in this report, which is by Lt-Colonel E Bisset, IMS, formerly Assistant Director and now Officiating Director And we may add that Colonel Bisset's report is one of very real interest to all interested in public health problems in India

The 1921 census shews that the total population of Burma is 13,212,192 spread over an area of 233,707 square miles and registration of vital statistics is now compulsory over practically the entire area, legislation having gradually extended the area concerned from urban to rural districts Yet, at present, where do we stand with regard to such registration, which must form the basis of most public health work in a community? "Several generations must pass," writes Colonel Bisset "before a primitive people can be expected to appreciate the economic importance of accurate vital statistics For many years the process of collection must be regarded largely as an educational measure, and deductions of only a very general nature are to be made from the figures collected and he goes on to point out that at the 1910 census in the United States the registration area only covered 59 per cent of the total population, whilst in 1921 Rosenau claims that in the U S A people as a whole have not yet become accustomed to the registration of births There are three standards of registration in Burma (a) full registration with every detail as to the cause of death (b) limited registration requiring the actual numbers of births and deaths, and with particulars of sex and in the case of death the age at death (c) a still more limited form of registration requiring only particulars of the total number of births and deaths And that Burma is really tackling the problem is shewn on page 3 of this report where there is outlined a unique and novel method of using tallies for an illiterate population Bamboo splits are used for both each birth and each death For males the bits of bamboo are pointed at one end, for females they are notched for births short splits of an inch, and for deaths longer ones of 1½ inches are used For births the month in which the birth took place is recorded by notches cut into the edge, thus a birth in June requires six notches for deaths the age of the person is recorded by a notch cut into the decade concerned, and the month by notches cut at the bottom of the bamboo Everyone in India interested in public health matters would do well to consult the original report, for here is a most suggestive and ingenious method suitable for an illiterate population In general, and in this report especially we find emphasised that, whilst the registration of births tends to be entirely neglected, the registration of deaths is far more accurate,—inasmuch as



legal regulations require it before the body is disposed of. In villages probably not more than two-thirds of the deaths are recorded, but in towns very few escape registration. "The root of the trouble is that there is no incentive to birth registration. A birth certificate is of no value to a child nor a death certificate to the surviving relatives. It may be possible in future years however to devise some means of making these documents of legal value." Successful vaccination of a population of course depends on accurate birth registration, also an accurate information about infant mortality is to the public health officer what a clinical thermometer is to the physician. Probably the actual birth rate in general for Burma is somewhere in the neighbourhood of 50 per mille yet different areas register figures varying from 14 to 58 per mille. The result is that when a census comes to be held the most glaring discrepancies become visible in areas and provinces where, during the decade, the recorded deaths have been in excess of the recorded births, it is found that the population has actually increased.

A few civil surgeons are specifically mentioned as having taken considerable trouble to check the registers more however are noted as having neglected the matter whilst the few fines imposed hardly affect the issue.

In Yamethin 425 omissions of births and only 4 omissions of deaths were detected during the year, whilst under orders from the Deputy Commissioner the birth register of every village which returns a birth rate below 16 per 100 houses is inspected. The results are of interest.—In Amherst district the headmen of 13 villages were found not to be in possession of birth registers.

In some villages the birth and death registers were very carelessly handled, pages torn out or lost, various columns either not filled in or wrongly entered. The Deputy Commissioner of Pegu, having investigated matters found that the township officer and the police agency blamed each other and has now fixed the responsibility on the head clerk of the township office. Other Deputy Commissioners are following suit.

Turning to other matters, Colonel Bisset notes that the figures for Burma do not bear out Dr Bentley's claim of a negative correlation between death rates and food prices. The birth rate for the Province as a whole was 29.69 and the urban birth rates were in some instances so low,—e.g. 14.41 for Syriam—that special investigations were called for, and shewed that the main reason was defective registration, the corrected figure for Syriam should have been 31.85. In no less than 15 big towns with a population of over 10,000 no still births were recorded a state of things which it is impossible to believe. The provincial death rate was 22.25. Here although the general registration is better, the diagnosis as to cause of death usually rests upon very little evidence. The infantile mortality rate for the Province was 174.49 and in Sandoway District, which returned the highest rate there were 2,991 deaths, of which 1,382 were from fever and no less than 1,045 deaths in infants. The Deputy Commissioner writes "I say to every Burman I meet—Sanitation means the saving of your country. Public opinion has long been apathetic towards all but the most primitive sanitary principles but if a national feeling can be aroused by fixing popular attention on the connection between sanitation and their very existence, if infant mortality can be illustrated in its causes and effects, more might be accomplished in a year than has been done by the bye-laws of a century." True remarks yet the only interest which certain political orators in the country take in public health measures is to try and persuade people not to be inoculated when plague is rife!

The returns for urban infant mortality are unreliable *in toto*. "Unless municipal committees take up the matter seriously nothing can be done." The bye-laws are there, but they remain a dead letter. In Mandalay, Dr Mullan, Medical Officer of Health, has done excellent work in checking and ensuring the accuracy of registers and here the figures are of interest. In three years, as the total number of births recorded rose from 4,768 to 6,406 the infant mortality figures fell from 490 to 305.

Infant welfare societies are at work in Rangoon, Moulmein, Panggyi and Meiktila, and the British Red Cross Society central organisation, which had lapsed after the war, has now been resuscitated on a different basis for peacetime duties.

Cholera shewed an increase on 1921 of 1,256 more deaths,—5,047 deaths in all. Prome was especially attacked, at first in the district areas, later in Prome itself. In the latter, with cholera prevalent in the district, with a large festival in prospect which was certain to be attended by several infected persons from the district, the pump and general water supply from the water works was known to be defective, yet no steps at all appear to have been taken to cope with an obviously dangerous situation whilst, despite the protests of the Health Officer, the conservancy staff were reduced by 19. The result was a severe outbreak, starting with the festival at the end of October and carrying on to December. At Bissim an outbreak occurred among Ooria coolies employed at a mill, panic seized the coolies who scattered all through the town, and 234 deaths occurred.

Small-pox was also on the increase in 1922 with a total of 1,439 deaths. 68 per cent of it occurred in rural areas and the Southern Shan States were more heavily infected than before. In Magwe District there was an extremely severe outbreak which continued to rage at the end of the year. The vaccination supervisor was found to be suffering from venereal disease, to have avoided travelling as much as possible, and to have faked the registers and his diary. He was dismissed. Both here and in the other epidemic areas special measures had to be taken and extra personnel employed, and wholesale vaccination has been pushed.

Plague accounted for 7,282 deaths, an increase of nearly 2,000 on 1921. It chiefly affected the urban areas. The outbreak in Meiktila district was a continuation of that from 1921. A specially trained and additional sub-assistant-surgeon was sent to assist the civil surgeon, here the people are taking to inoculation. In Pyin Oo U the hard work and success of Dr Basu, the civil surgeon and of Dr J. C. Pillay, are especially mentioned in this connection. In Lower Chindwin political agitators got hold of the people, preaching a campaign against anti-plague inoculation. One of them however fortunately contracted plague and died of it, and this, together with the hard work of Dr Po Mya, the civil surgeon amid an atmosphere of considerable difficulty, achieved useful results. In Maymyo the infection was imported with infected rats in grain and there were 291 deaths. Special staff had to be employed, but a vigorous and successful campaign resulted. 67,410 inoculations were performed in the Province during the year.

I ever accounted for a total of 239,448 deaths, or 34.6 per cent of the mortality. Burma does not enjoy the services of a whole time malariologist, and until such services are available it is practically impossible to make progress. The sale and in some instances free issue of cinchona febrifuge tablets was continued during the year and here some very interesting figures are given of the annual consumption per head of cinchona febrifuge throughout the province, the amount varies in different districts from 3 to 8 grams per head of the population per annum. *Inter peduncularis* extract is under experimental trial in malaria.

Influenza was prevalent in some areas especially a virulent outbreak in the Salween district. Villages were deserted wholesale, and probably some 500 deaths occurred. Beriberi was only mildly prevalent. An outbreak of epidemic dropsy occurred in Pagan Jail and another in the military police at Victoria Point.

The total expenditure on sanitary works was Rs 89,66,675 which represents some 56.5 per cent of the income of municipalities and 4.5 per cent of that of district boards. (Figures of this type, one may remark, are badly wanted and it would be of great interest to secure figures for all India and for the different Provinces, shewing what proportion of the public revenues is expended on law, transport, general education, etc., as compared with the proportion expended on medical



relief, medical education and preventive medicine. The results might be startling at present we are inclined to believe that public health comes nearly last when it comes to apportioning revenue.)

The Port Health Department, Rangoon, dealt with 1,412 vessels and 300,943 passengers a sufficient indication of the onerous nature of its duties. Sanitary inspection of Anglo-Vernacular and European schools in general shewed a satisfactory state of affairs. On the other hand Municipal Committees tend to become retrograde in matters of public health. Appointed in 1921, and given the option of co-opting civil surgeons and health experts as members, many such committees have ignored such available advice, and their attention has been drawn to the matter in a Government circular.

In conclusion Colonel Bisset comments on the future prospects in Burma. The adult Burman, he considers, will never develop a public health conscience, but the schoolboy may be taught. Here the first necessity is to first train the teachers and Major G. G. Jolly, I.M.S., who joined the department in 1922 as Assistant Director, made a good beginning by giving courses of lectures to university candidates for the teachers diploma. It is along lines such as these that the most hopeful progress may be looked for.

The appendices to the report include many statistical tables, and a very interesting report by Dr J. P. Cullen, M.D., D.P.H., Chief Medical Officer, Burma Corporation, Namtu, on the mines in the Northern Shan States. Considerations of space preclude this from our review, but one interesting point in it may be especially noted for those interested in the subject both relapsing fever and beriberi are found to occur only among the Chinese in the mines. The men infected with beriberi were found to have contracted with a contractor to feed them, the sole article of diet given was polished rice, and analysis shewed that of four samples used two were below the figure fixed by legislation in phosphorous content and the other two were at the border line figure.

We wish that reformers in a hurry would pause to study documents such as this. They reveal far more of the real conditions and problems present than does any congress oratory. We fear that any such wish is vain. On the other hand, depressing as conditions are, the outlook is not without hope for the future.

#### TRIENNIAL REPORT FOR THE HOSPITALS AND DISPENSARIES IN BURMA 1920 TO 1922. RANGOON, SUPERINTENDENT, GOVT PRINTING, BURMA. PRICE Rs 2-8-0

This report which is by Colonel P. Dee, M.B., I.M.S., deals chiefly with a period when Lt.-Colonel J. Entrican, M.D., C.F., I.M.S., was in charge. Colonel Entrican left on leave prior to retirement in September 1922, when Colonel Dee took over charge.

The triennium was a very important one, since, under the Reforms Scheme it was proposed to hand over the management of hospitals and dispensaries to local committees. A somewhat similar scheme which was tried some years ago had to be abandoned for two chief reasons: the committees were found to be insufficiently independent of control by the Municipal Committees, and the budget balances at the end of any financial year went, not to any hospital fund but to general municipal funds. Secondly, subscriptions from the public all went to providing extra comforts, etc., for patients, and none towards meeting the usual expenses of the hospitals. This has now been changed and under a Government resolution a new system of committee management adopted which is now on trial.

A further important departure is the opening by the University of Rangoon of an M.B. course for students. Here, as so often in India, the chief difficulty encountered is the provision of facilities for the study of gynaecology and midwifery.

The pay of all grades of the medical services was improved during the triennium, thus removing to a great extent the discontent which had become rife. Although the sanctioned I.M.S. cadre for Burma is

42 (35 appointments plus a leave reserve of 7), only 31 officers were available at the end of 1922, and the shortage of commissioned officers has been seriously felt. The Uncovenanted Medical Service disappeared from Burma in 1922 with the retirement of its last member there, Dr H. E. Wells. More civil surgeoncies were made over to civil assistant surgeons, the number of such permanent appointments being raised from 4 to 8. In addition to this free facilities were granted during the triennium to assistant surgeons to officiate as civil surgeons, and on the whole, it is recorded that they have carried out their duties very satisfactorily. At the end of 1922 there were 27 military assistant surgeons on the cadre, 35 civil assistant surgeons and 3 private practitioners. The Inspector-General writes that, whilst he is satisfied with the general work of the civil assistant surgeons he finds them too reluctant to undertake surgical work, "in many of the hospitals I found excellent operation rooms and equipment, but practically no surgical work was done."

With the increase in pay of sub-assistant surgeons to Rs 100-25-200-225-250, no difficulty has been experienced in getting this useful class of officers. The sanctioned cadre is 389, but there are 420 at present employed. "There can be no doubt that sub-assistant surgeons in most instances are doing useful work in the Province and have been of great assistance." Post-graduate training for sub-assistant surgeons of less than ten years' service has been introduced, and it is hoped to do away with the system of examinations for promotion and to substitute a system of post-graduate training. With regard to other branches of personnel, the pay of compounders has been improved, nursing sisters it has proved almost impossible to get since they can easily earn much more in private nursing in the larger cities, whilst compulsory registration of nurses and midwives became law in November 1922 a much needed improvement.

The triennium opened with 269 hospitals and dispensaries, and closed with 284. The travelling dispensaries have proved so successful that proposals to extend this sphere of work are under consideration. Not only are they of great value in providing medical relief in outlying districts, their educational value is considerable. A scheme has also been instituted of providing some knowledge of the rudiments of western medicine to the *Se-Sayas*, and a Burman sub-assistant-surgeon selected to teach them. Maternity wards, shelters and homes have developed considerably in the different provincial hospitals as the result of private and public donations. The Red Cross Society has commenced an active campaign of public health, child welfare and similar activities. The total number of indoor and outdoor patients attended is steadily rising year by year, and in 1922 totalled 2,125,784 or, during the triennium no less than 16 per cent of the population, a figure which suggests that some 5 per cent of the population visit hospital per annum.

Of different diseases malaria accounted for 15 per cent of the total attendance during the period. Cinchona febrifuge tablets have been substituted for quinine. Small-pox is troublesome, but compulsory vaccination of all in-coming passengers into Burma helps to keep it in check. Plague has increased in virulence, with a case death rate of over 60 per cent of admissions during the triennium,—as most cases when brought to hospital are nearly moribund. Santonin being so expensive "*kirmam* powder" was tried as a substitute but found to be of little value. No less than 50,201 cases of venereal diseases were treated in 1922, and these constitute a serious problem in the Province. Treatment is unsatisfactory, as most patients discontinue treatment after one or two preliminary injections have cleared the more obvious clinical symptoms. Several fatalities occurred in the use of salvarsan derivatives by quacks, and it has been proposed to legally classify these products as poisons within the provisions of the Poisons' Act, and accessible

only to registered medical practitioners. The cost of the salvarsan derivatives being so high, free treatment is impracticable, and patients are usually asked to pay for the cost of the drug. Tuberculosis is very prevalent in Burma, and especially so in Rangoon with its poorly ventilated places of amusement.

The health of the military police has shown a marked improvement during the three years. Taking patients generally the Burman shows a readiness to come to hospital far greater than that of the Indian, and Burmese constituted 62 per cent. of those treated. In Rangoon General Hospital there is a steady increase in the general surgical and operative work year by year, and all classes of surgery are well represented. The total income for the hospitals and dispensaries was over 33 lakhs per annum, and private subscriptions show a satisfactory improvement. In this connection it is interesting to note that over 37 per cent. of such total subscriptions are subscribed by European residents and firms, the Indian and Burman contributions being less generous. In Rangoon a scheme for starting a home for incurables is on foot in connection with the Rangoon General Hospital which may help to free badly needed beds. Sub-assistant surgeons here annually receive post-graduate training and the Inspector-General pleads for a whole time pathologist to deal with the mass of very valuable material for study, much of which at present goes to waste. The four leper asylums have seen considerable improvements, especially in laboratory provision. The Lady Minto nurses during the triennium numbered 323 as against 241 previously. The Dufferin Hospital dealt with 1,697 in-patients during 1922 and is steadily gaining in popularity among the European and Anglo-Indian community, though but little resorted to by the Burmese. Finally Colonel Dees draws attention to what is a serious matter in India also the abuse of hospital facilities by those who could afford to pay, free patients arriving at hospital in their own private motor cars.

Colonel Dees' whole report is a record of steady progress on which the Province is to be congratulated. The nightmare of stringency of funds appears to rest less heavily in Burma than in India.

#### ANNUAL REPORT OF THE BURMA GOVERNMENT MEDICAL SCHOOL, RANGOON, FOR 1922-23. RANGOON, SUPERINTENDENT GOVT. PRINTING, BURMA. PRICE 4 ANNAS.

This report, by Lt.-Colonel A. Whitmore M.D., F.R.S., shows that the Rangoon Medical School is faced, as are other medical schools in India, with the question of coping with ever increasing numbers. The year having commenced with 173 students on the roll as against 162 in 1921-22 and 50 further admissions during the year. The hostel accommodation has been extended. 31 students qualified during the year and 24 students were sent to undergo training in practical midwifery to the Government Maternity Hospital, Madras. At present apart from provision for lady students at the Dufferin Hospital in Rangoon there is little accommodation for midwifery training of students in Rangoon, but it is hoped to convert certain wards at the Rangoon General Hospital into maternity wards when such teaching and facilities will become available. The staff on the School is a very strong one and, with the institution of an M.B. examination by the University of Rangoon its future usefulness and success seem assured.

27th August last and tested in Lahore on the 16th, 17th and 18th October, no special precautions in the way of cold storage having been taken to preserve its potency in the meantime. The insulin was of American manufacture, and, judging from one's previous experience in England with insulin of the same brand, was presumably of full strength when it left London. One c.c. had contained 20 units.

The sample was tested by observing its effect on the blood sugar of rabbits although this has been shown by McLeod and others not to be a satisfactory method of standardisation, it nevertheless gives an indication of the strength of the extract and has been the method mostly used until recently. While the experiments were being carried out I noticed in the press a communique from the Government of Burma pointing out the great deterioration undergone by insulin in the tropics as revealed by observations made at the Pasteur Institute, Rangoon. The result of my examination of a single sample bears out these results, although the amount of deterioration is much less than that found in the samples tested in Burma. One c.c. containing originally 20 new units produced convulsions in a small rabbit when the blood sugar was less than 0.034 per cent. This amount, therefore contained roughly about one "rabbit dose," i.e., 3 new units. The preparation would therefore appear to have deteriorated to about 1/7th to 1/8th of its original strength. The results of three experiments were as follows—

*Experiment I*—Rabbit 1.20 kilos  
Starved for 18 hours— $\frac{1}{2}$  c.c. insulin subcutaneously  
Original blood sugar—0.140 per cent.  
Blood sugar  $\frac{1}{2}$  hour after insulin 0.131  
" " 1 $\frac{1}{2}$  hours " 0.098  
" " 3 " " 0.071  
" " 4 $\frac{1}{2}$  " " 0.089

*Experiment II*—Rabbit 1.20 kilos  
Starved for 24 hours— $\frac{1}{2}$  c.c. insulin subcutaneously  
Initial blood sugar—0.141 per cent.  
Blood sugar  $\frac{1}{2}$  hour after insulin 0.080  
" " 1 " " 0.062  
" " 1 $\frac{1}{2}$  hours " 0.071  
" " 2 $\frac{1}{2}$  " " 0.071  
" " 3 $\frac{1}{2}$  " " 0.085

*Experiment III*—Rabbit 1.25 kilos  
Starved 24 hours—1 c.c. insulin subcutaneously  
Initial blood sugar 0.135 per cent.  
Blood sugar  $\frac{1}{2}$  hour after insulin 0.092  
" " 1 " " 0.079  
" " 1 $\frac{1}{2}$  " " 0.060  
" " 2 $\frac{1}{2}$  " " 0.053  
" " 3 $\frac{1}{2}$  " " 0.034

The animal went into convulsions two hours later.  
The blood sugar was estimated by MacLean's method for 0.2 c.c. blood—Yours, etc.,

T. A. HUGHES, M.D., M.R.C.P.  
Major, I.M.S.

LAHORE  
24th October 1923

#### PLASMODIUM TENUE AND P. OVALE

To the Editor, 'THE INDIAN MEDICAL GAZETTE.'

SIR—With reference to Professor Stephens' letter on this subject in the October 1923 number of the *Indian Medical Gazette* while expressing no opinion on the supposed decrease of *Plasmodium tenue* or the disputed viability of the premature-born *P. ovale*, I should like to express my sympathy with Professor Stephens in his protest against neither being given any chance of existence because they had not been properly christened in a bath of hamatoxylum. Surely all previous malarial parasites have been born in drought, rained upon by alcohol, and then christened in Romanowsky.

Having at their birth passed unscathed through this experience, surely it is fair to test the viability of other newly-born malaria parasites with the same ceremonies,

## Correspondence.

### INSULIN IN THE TROPICS

To the Editor, "THE INDIAN MEDICAL GAZETTE"

SIR—The following observations on the potency of a sample of insulin recently imported into India may be of interest. The sample was obtained in London on

since at present there is no other standard of comparison  
—Yours, etc,

H E SHORTT,  
Major, I M S

PASTEUR INSTITUTE, SHIMLON,  
6th November 1923

### MALARIA IN ASSAM

To the Editor, "THE INDIAN MEDICAL GAZETTE"

SIR,—You may be interested to learn of the discovery in Assam, during an investigation in which I am engaged at the instance of the Indian Tea Association into conditions affecting the incidence of malaria in the tea gardens of this province, of the anopheline mosquito *A. umbrosus* (Theob.)

This species it is, of course, which is so closely associated with the epidemiology of severe malaria in Malaya, and it is therefore fair to presume that its presence in Assam is a factor of importance in the tea gardens, to what extent will, it is hoped, be elucidated by the continuance of the observations now being carried out.

The effect of its ravages was typically seen in a settlement of *Daphlus* carved out of the jungle in the Balipara Frontier Tract which I visited at the invitation of Captain Navill, P O, with Dr Forsyth and Dr Jameson. I could only conclude during my visit there that the spleen index of 100 per cent among the children was due to the operations of *A. umbrosus*. The conditions were exactly similar to those in places in Malaya where *A. umbrosus* is found to be causing much malaria, and many breeding places of the species were found.

This is not perhaps a matter of surprise, for the Assamese fauna in general and the anophelines in particular follow the Malayan so closely,—indeed Christophers anticipated the discovery in his *Synoptic Table of Indian Anophelines*—Yours, etc,

C STRICKLAND, M A, B C  
Professor of Medical Entomology, Calcutta  
School of Tropical Medicine and  
Officer in Charge, the I T A, Malaria  
Inquiry Assam Tea Gardens

12th November 1923

### RHINOLITHS

To the Editor, "THE INDIAN MEDICAL GAZETTE"

SIR—In your issue of October 1923, Mr L M Chakraverty describes a rhinolith removed from the nose of a Mahomedan male aged 38, and asks whether it is possible for a tamarind seed put in some 28 years ago to form round it a rhinolith. My experience at the J J Hospital, Ear, Nose and Throat Department, where every day some foreign body is removed from either the nose or throat is that

(1) Tamarind seeds are the commonest seeds introduced into the nose by small children, not adults, and it is customary for the parents to bring the child within a few days to a few months. It could not remain there for 28 years without causing trouble.

(2) Rhinoliths occur after injury to the nasal mucous membrane such as after bleeding or pricking, and the rhinolith forms from the secretions of the nasal mucous membrane aided by bacteria, as with gall and renal stones, and occurs in those cases only where an irritating nasal discharge has lasted a couple of years or more.

(3) That it is often difficult to remove these rhinoliths, not the so-called foreign body or pebble or stone entirely. It is most likely that the tamarind seed was put into his nose and either passed out or was swallowed by the patient when twelve years of age. Certainly there was no evidence of its presence in the broken pieces removed by Mr Chakraverty—Yours, etc,

F W BANA, M B  
MRCS DPH, DTM & H  
Junior Hon Aural Surgeon,  
J J Hospital, Bombay

BOMBAY  
12th October 1923

## Service Notes.

### APPOINTMENTS AND TRANSFERS

MAJOR-GENERAL C H BOWLE-EVANS, C M G, C B F, M D, is appointed as Honorary Physician to the King, India. Military Forces.

Lieut-Colonel F E Wilson, I M S, is appointed as Civil Surgeon, Quetta, with effect from the 16th October 1923.

Lieut-Colonel R F Baird, I M S, is appointed as Inspector-General of Civil Hospitals, United Provinces, with effect from the date on which he assumes charge.

The services of Lieut-Colonel R McCarrison, C I F, M D, I R C P, V H S, I M S, are placed at the disposal of the Foreign and Political Department, with effect from the 1st December 1923.

Lieut-Colonel R M Carter, C B, F R C S, I R C P, D T M I M S, to act as Senior Medical Officer and First Physician J J Hospital and Professor of Medicine and Therapeutics, Grant Medical College, Bombay.

Lieut-Colonel G D Franklin, O B E, B A, M B, I M S, is appointed as Chief Medical Officer, North-West Frontier Province, with effect from the afternoon of 15th November 1923.

Lieut-Colonel H C Keates, M D, I M S, is appointed as Civil Surgeon, Amritsar, with effect from the afternoon of 15th September 1923.

Lieut-Colonel J W Watson, C I E, I M S, is appointed as Civil Surgeon, Ajmere, and Chief Medical Officer in Rajputana, with effect from the 13th November 1923.

Major H Hingston, I M S, to act as First Resident Surgeon, Presidency General Hospital, Calcutta.

Major E B Munro, O B E, M B, I M S, to act as Civil Surgeon, Burdwan, from the forenoon of 2nd November 1923.

Major K S Thakur, I M S, is appointed as Civil Surgeon, Bakarganj.

Major S S Vazifdar, M R C S, M R C P, I M S, to act as Second Physician and Registrar, J J Hospital, and Professor of Materia Medica and Pharmacy, Grant Medical College, Bombay.

Major A H Proctor, D S O, M D, F R C S E, I M S, is appointed as Civil Surgeon, Murshidabad.

Major N M Wilson, O B E, I M S, is appointed as Civil Surgeon, Lyallpur, with effect from the 15th October 1923.

Major R A Chambers, O B E, I M S, is appointed as Principal, Medical School, Amritsar, with effect from the 22nd September 1923.

Major A M Dick, O B E, F R C S, I M S, is appointed as Professor of Ophthalmology, King Edward Medical College, Lahore, with effect from the 1st October 1923.

Major T A Hughes, M D, I M S, is appointed as Professor of Physiology, King Edward Medical College, Lahore, with effect from the 1st October 1923.

Major D H Rai, M A, M C, I M S, is appointed as Professor of Materia Medica, King Edward Medical College Lahore, with effect from the 1st October 1923.

Major Anderson, I M S, is appointed acting Civil Surgeon, Quetta, with effect from the 1st October 1923, in addition to his duties as Civil Surgeon, Sibi.

The services of Captains N K Bal, M C, I M S, and N M Mehta, I M S, are placed temporarily at the disposal of the Government of Madras, with effect from the dates on which they assume charge of their duties.

Captain H G Alexander, I M S, to act as Second Resident Surgeon, Presidency General Hospital, Calcutta.

Captain R Sweet, D S O, M B, I M S, is appointed as Assistant to the Officer in charge, Medical Store Depot, Madras, with effect from the 12th January 1923.

Captain S N Hayes, I M S, is appointed as Civil Surgeon, Dera Ghazi Khan, with effect from the 10th October 1923.

The services of Captain J W Jones, D S O, M B, I M S, are placed temporarily at the disposal of the Government of Burma with effect from the date on which he assumed charge.

# Food for the Invalid



When your patient needs a strengthening and easily digested food use Bovril.

Bovril is the powerful nourishment of beef in a highly concentrated form. It is easily assimilated even by a weakened digestion, and it helps to restore the system to a normal state of health.

The stimulating and strengthening powers of Bovril are particularly valuable in cases of lowered vitality, where the patient does not respond to ordinary invalid diet.

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as well as the "defective" or "abnormal" child—presents one of the most difficult problems in medicine. If the diagnosis does not reveal definite changes in the cerebral cortex, the child may be "hypocrinic" and

## PROBABLY NEEDS

pluriglandular treatment. Since the thyroid, pituitary and thymus glands are related in the causation of developmental dystrophies, a pluriglandular combination is indicated.

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has been used with benefit in treating defective children. Each dose contains 2 gr desiccated anterior lobe, 1 gr thymus, and  $\frac{1}{2}$  gr thyroid. Sig. 1 Sanitab<sup>l</sup>et twice a day at meals for four out of every five weeks.

"An Index of Organotherapy" by Harrower, 162 pages, will be sent without charge to any medical man on request.

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The services of Captain T S Sastry, I.M.S., are placed temporarily at the disposal of the Government of Madras, with effect from the date on which he assumed charge.

The services of Captain B G Malka, I.M.S., are placed temporarily at the disposal of the Government of Bengal for employment in the Jail Department, with effect from the 3rd July 1923.

#### LEAVE

COL. A W R COCHRANE, M.B. F.R.C.S. I.M.S., Inspector-General, Civil Hospitals, United Provinces, is granted leave for 8 months, with effect from the 13th November 1923.

Lieut-Col F T Gordon-Tucker, I.M.S. Senior Medical Officer, I J Hospital Bombay, is granted leave for 7 months and 1 day, with effect from the 10th November 1923 or from the date of relief.

Lieut-Colonel R McCarrison C.I.E., I.M.S. an Agency Surgeon, is granted leave for 28 months, with effect from the 1st December 1923, on reversion to the Foreign and Political Department.

Lieut-Colonel H Halliday, M.B., I.M.S. Civil Surgeon, is granted leave for 1 year with effect from the 20th October 1923.

Lieut-Colonel A C MacGilchrist, I.M.S., Civil Surgeon, Howrah, is granted leave for 11 months, with effect from the 7th November 1923.

Major J I Harper Nelson, D.S.O. M.C., M.D. F.R.C.S. I.M.S., Professor of Materia Medica, King Edward Medical College, Lahore, is granted leave for 8 months and 23 days, with effect from the 16th June 1922 to 1st October 1922.

Major H H Thorburn C.I.E. I.M.S. an Agency Surgeon, is granted leave for 12 months, with effect from the 1st October 1923.

Major E W O'G Kirwan, I.M.S. 1st Resident Surgeon, Presidency General Hospital, Calcutta, is granted leave for 12 months with effect from the date on which he may be relieved from his duties.

Captain R Sweet, D.S.O. M.B. I.M.S. Assistant to the Officer in charge, Medical Store Depot, Madras, is granted leave for 1 month, with effect from the 12th January 1923.

#### PROMOTIONS

##### *Lieutenant-Colonel to be Colonel*

J A BLACK, M.B., I.M.S., 27th October 1923

##### *Major to be acting Lieutenant-Colonel*

M F White D.S.O., M.B. I.M.S., 18th June 1918 to 31st July 1919

##### *To be Captains*

Alexander Henderson Craig Dated 1st October 1923

##### *To be Lieutenant*

Gerald Hartas FitzGerald Dated 1st October 1923

##### *To be temporary Lieutenants*

Shiv Das Suri Dated 24th September 1923

Shambhoo Dayal Misra Dated 28th September 1923

Subbier Annaswami Dated 3rd October 1923

Amar Nath Duggal Dated 12th October 1923

Chandranan Joshi Dated 20th October 1923

With reference to Army Department Notification No 548, dated the 14th March 1919, the promotion to his present rank of Major I F James, M.B., I.M.S., is antedated from 1st September 1918 to 1st March 1918.

#### RETIREMENTS

LIEUT-COLONEL DAVID MACDONALD DAVIDSON, C.I.E., M.D., I.M.S. Dated 24th October, 1923

Major G Tate, I.M.S. Dated 30th September 1923

#### RELINQUISHMENT OF RANK

CAPTAIN J R D WEBB, D.S.O., I.M.S., relinquishes the temporary rank of Major on ceasing to hold the appointment of Deputy Assistant Director of Medical Services on 28th March 1922.

#### RESIGNATIONS

CAPTAIN CHANDIRAM HASSOMAI PRIMIANI Dated 1st September 1923

Captain Lal Singh Anand Dated 30th April 1922

Captain Brayendra Nath Pal, Captain Prabhat Kumar Bardhan, Captain Kannauthodath Padmanabha Menon—Dated 1st September 1923

Captain Bhawanilal Kumbhal Vardya Dated 19th September 1923

Captain Fayaz Anwar Khan Dated 22nd July 1923, and to retain his rank.

Captain Buthapuri Thevaperumal Krishnan Dated 1st September 1923 and to retain his rank.

## NOTICES

### ROYAL MEDICAL BENEVOLENT FUND

THE 88th annual report of this Fund, for the year 1922, shows how widespread are its activities and how great are its needs. The objects of the Fund are to make grants to distressed members of the medical profession and their widows or orphans, and to provide annuities to the more urgent of such cases after 60 years of age. Last year there were 168 annuitants on the roll, receiving annuities of from £20 to £26, whilst the grants, which vary from £5 to £26 according to the necessities of the case totalled £4,435. The Guild, or Ladies Branch also renders personal service and also gives grants. That the Fund is well run and administered is shown by its list of officers, Sir Thomas Bulow being President for 1923, Sir Charters Symonds Hon. Treasurer, and Dr Newton Pitt, Hon. Secretary.

At the annual meeting held on the 7th May, the Archbishop of Canterbury was the chief speaker, and his address is one which will be gratefully read by the medical profession. He speaks of the great volume of work unostentatiously carried out by medical workers in both peace and war, of the fellowship of medicine, and the needs of the dependents of medical men, who are often prone to leave but little provision for their families. As a professional beggar he knew of no object more deserving of assistance than the Fund. Lord Sumner dwelt on the practice of medicine being often its only reward, he suggested that the working classes of England would be quite willing to help if approached, and gave a most interesting analysis of the best way of getting donations out of wealthy men, the motto being not to overdo it but to lead the donor gradually and almost imperceptibly to his cheque book.

The Royal Medical Benevolent Fund is one of the finest and most deserving of medical charities and one which stands urgently in need of support by the whole profession. The address is 11 Chandos Street, Cavendish Square, London, W1.

### CALCUTTA SCHOOL OF TROPICAL MEDICINE AND HYGIENE

THE undermentioned candidates passed the Certificate examination in Tropical Medicine and Hygiene held on the 5th October, 1923, and subsequent days. The names have been arranged in alphabetical order—

- 1 Mr Ramchand Chopra, I.M.P. (Lahore)
- 2 S A S Narhar Kesheo Godbole, I.M.P. (Nagpur)
- 3 S A S Jamadar Vithal Govind Kamat (Diploma holder B J Medical School, Poona)
- 4 S A S Rama Prasanna Roy, I.M.P. (Bengal)
- 5 Mr Jatindra Kumar Sen, I.M.P. (Bengal)
- 6 Mr Baldeo Sinha I.M.P. (Bengal), I.M.P. (Bihar and Orissa)

\*7 S A S Suraj Naram

\*With distinction

23rd October 1923

## BOOKS ON DENTISTRY AND DENTAL PERIODICALS

MESSRS BAILLIÈRE, TINDALL & COX, 8, Henrietta Street, London W.C.2, have recently issued as a small brochure a complete list of current books on dentistry in the English language. The list contains many books of interest not only to dental practitioners, but also to the medical man and to the radiologist. A complete list of dental periodicals is also included. The publishers intend to re-issue this catalogue periodically, and would be glad to have the name of those who wish to receive it. Messrs Baillière Tindall & Cox's new departure is one to be welcomed and we trust that it will receive the support of our readers.

## LONDON MEDICAL EXHIBITION, CENTRAL HALL WESTMINSTER, LONDON

October 1 to 5, 1923

## EXHIBIT OF BURROUGHS WELLCOME &amp; CO

THE interest and enthusiasm aroused by the discovery of Insulin and the results of its use in diabetes mellitus, fully justified the prominent position assigned to this product in the extensive exhibit of Messrs Burroughs Wellcome & Co. at the London Medical Exhibition. Eleven stages in the production of "Wellcome" Brand Insulin, starting with the extraction of pancreas and ending with the refined product now available for medical use were shown. It is easy to understand that the exceptional equipment and long experience of Burroughs Wellcome & Co. on the chemical and pharmaceutical side of biological therapy, placed them in a particularly advantageous position for the large scale production of Insulin.

Other biological preparations were shown, a very interesting series being that of the various glands which enter into the composition of "Tabloid" Mixed Glands, "Hypoid," "Infundin," a stable, concentrated pituitary extract, took its place in the exhibit of products of animal origin. Sera and vaccines displayed on the walls of the exhibit, in a convenient and attractive fashion, the wide range of modern medical products issued under the "Wellcome" Brand. Tropical diseases map displays were exhibited in connection with various medicinal products of importance in such diseases. Among these were "Charbion" and "Neokharsivan," for use in syphilis, tropical ulcer, etc., "Tabloids" and "Wellcome" Quinine preparations for malaria, "Moog" for leprosy, and "Soloid" Antimony for chaziosis, kala-azar and oriental sore.

A great feature of the various rustless steel hypodermic needles available formed another attractive feature of this fine display, while most of their well-known "Tabloid" "Hypoid" and other products were also in evidence.

## INTERNATIONAL UNION AGAINST TUBERCULOSIS

THE Council of Directors of the International Union against Tuberculosis held its annual meeting in Paris on July 26th 1923, at the headquarters of the League of Red Cross Societies. Twenty members of the Council from different countries met under the presidency of Dr Dewez of Brussels.

Professor Leon Bernard Secretary General, gave an account of the development of the Union since the Brussels conference. It was decided that the following questions should be placed on the agenda of the conference to be held at Lausanne in September, 1924.

- (1) Relations between pregnancy and tuberculosis to be reported on by Prof Forssner (Stockholm).
- (2) Do there exist naturally or can there be produced artificially saprophytic forms of Koch's bacillus which might become virulent tuberculosis bacilli?

Report by Prof Calmette (Paris)

- (3) Effects of the organization of the anti-tuberculosis campaign in different countries on the decrease in tuberculosis mortality.

Report by Sir Robert Philip (Edinburgh)

The report of Prof Besancon (Paris) on the question of the "respective value of techniques for the identification of Koch's bacillus in the diagnosis of lesions in human tuberculosis" gave rise to an interesting discussion. This report will appear in the next number of the *Bulletin of the International Union against Tuberculosis*.

## THE "SUNIC" DIATHERMY APPARATUS

DIATHERMY is to-day a new, a most important feature of medical and surgical therapy, and one with an immense future. But in such apparatus it is essential for the practitioner to get hold of absolutely reliable and sound apparatus. The chief difficulty with the apparatus is the spark-gap, and here Messrs Watson and Sons' outfit with its gas-atmosphere for the spark gap is an immense improvement upon other models. In matters electrical,—as in many others,—India suffers to an extent not always realised from inferior apparatus and bad workmanship, as every civil surgeon knows. Bad steel in his instruments, bad finish, and bad workmanship are characters of much of the medical and surgical apparatus on the Indian market, and the civil surgeon with any experience knows that he is only safe in ordering direct from home or from reliable firms in India. In Messrs Watson and Sons' little illustrated brochure on their "Sunic" diathermy apparatus he will find what he can rely upon as thoroughly sound, as first class workmanship and as thoroughly reliable. This little brochure contains an interesting abstract from an address at the Electro-therapeutic section of the Royal Society of Medicine by Dr E. P. Cumberbatch on the general principles and uses of diathermy, and an illustrated price list. The principal apparatus for thermo-penetration and coagulation complete, and mounted on a portable trolley is listed at £73-18-6, a special foot switch for surgical work which leaves both hands free for manipulating the electrode and tissues—an absolute essential, because any apparatus which necessitates manipulations with the hands at the most critical moments of operative procedure is unsuitable—at £4-4-0, a rotary converter for use with direct current in place of alternating at £40 and a diathermy condensation couch with complete fittings at £33-12-0. The address of the makers is Messrs Watson and Sons, Ltd, Sunic House Parker Street, Kingsway, London, W.C.2, and their Indian agents are the General Electric Co. (India) Ltd, 14 Old Court House Street, Calcutta, and 106 Armenian Street, Calcutta. The medical man who desires further information about this new and exceedingly important departure in medical and surgical practice, however, would do well to communicate direct with the home firm.

## Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints of the literary pages of the *Gazette gratis*, if asked for at the time of submitting their manuscripts.

Reprints of the article concerned (only) in place of reprints of the whole of the literary matter of the issue can be supplied on payment.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR *The Indian Medical Gazette*, c/o Messrs Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS Messrs Thacker, Spink & Co., P. O. Box 54, Calcutta.

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**ELIMINATES URIC ACID**

and is therefore a specific for

**GOUT, RHEUMATISM, ARTHRITIS, Etc.**

Weintraud found that in gouty patients on a purine-free diet it more than doubled the quantity of uric acid excreted in the urine

Chase and Fine found that in gouty cases the uric acid in the blood was reduced from 4 to 6 milligrammes per 100 grammes of blood to 2 milligrammes

A single dose of 30 to 40 grains taken by a healthy man increases his uric acid excretion threefold without altering metabolism. It acts on the kidneys and influences the renal cells in such a way that uric acid passes much more easily than before

AGOTAN is non-poisonous, and an eminent Professor states that, apart from its function as an eliminant of uric acid, Agotan will do anything that Aspirin does and a great deal more. It will, for instance, often relieve

**SEVERE HEADACHE, NEURALGIA, NEURITIS, Etc.**

WHEN ASPIRIN FAILS TO DO SO

HOWARDS'  
**A S P I R I N**  
**T A B L E T S**

GENUINE, EASILY DIGESTED, REALLY EFFICACIOUS AND  
PROMPT IN ACTION

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**P U R E Q U I N I N E**  
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who will be pleased to put Medical Men in touch with the nearest supplier

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## The Experience of Thirty Years Confirms its Value IN PHTHISIS.

**Angier's Emulsion** pacifies the irritable stomach and intestines, and renders them docile, receptive and retentive of food and medicine. It relieves the symptoms of digestive disturbance which are almost constantly present in Phthisis, and which constitute an insuperable barrier to proper nourishment and medication.

**Angier's Emulsion** facilitates, hastens and completes the processes of digestion and assimilation, so that the patient is enabled to take sufficient nourishing food. It is a strengthener and vitaliser to the body, fortifying its disease resisting powers by increasing the absorption of nutrient material, and it acts as an anti bacillary agent inhibiting the growth of disease producing bacteria and their toxins.

**Angier's Emulsion** has a specific palliative influence upon the symptoms of Phthisis — fever, night sweats, cough, expectoration, and exhaustion are ameliorated, and the life of the patient made more comfortable, more free from distressing symptoms. In most cases of Phthisis the use of Angier's Emulsion obviates the necessity of administering depressing and narcotising cough sedatives.

**Angier's Emulsion** is the most palatable of all emulsions, and is easily tolerated by delicate stomachs. It has no deleterious influence upon any function of the body, and it is taken by the patient with pleasure. In the advanced stage of Phthisis, the agreeable, soothing qualities of the Emulsion are especially appreciated and invariably afford much relief to the sufferer.

**Angier's Emulsion** should always be specified when prescribing petroleum emulsion, otherwise some disappointing imitation made with ordinary petroleum may be supplied.

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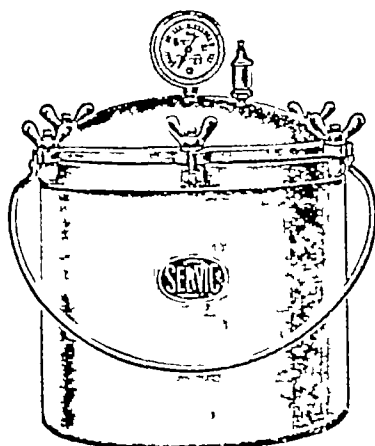
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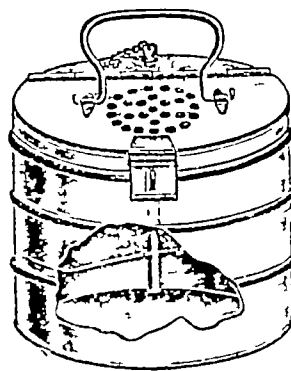
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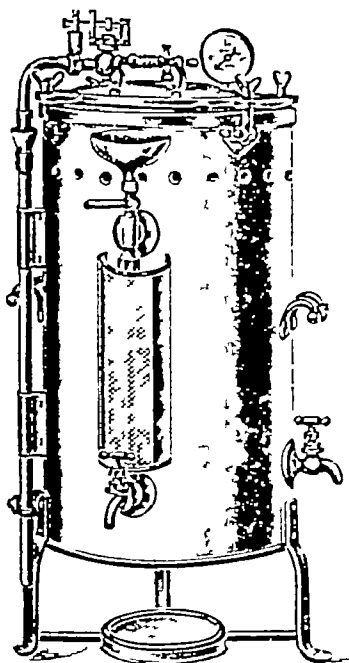


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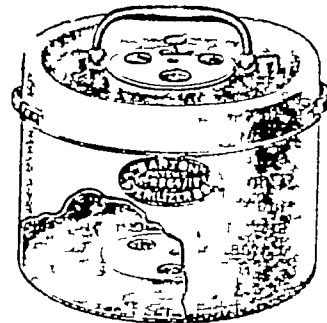


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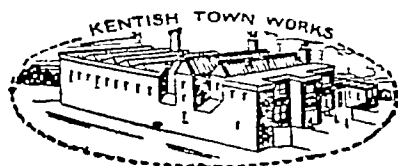


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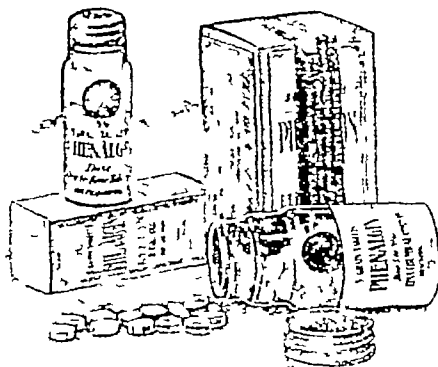
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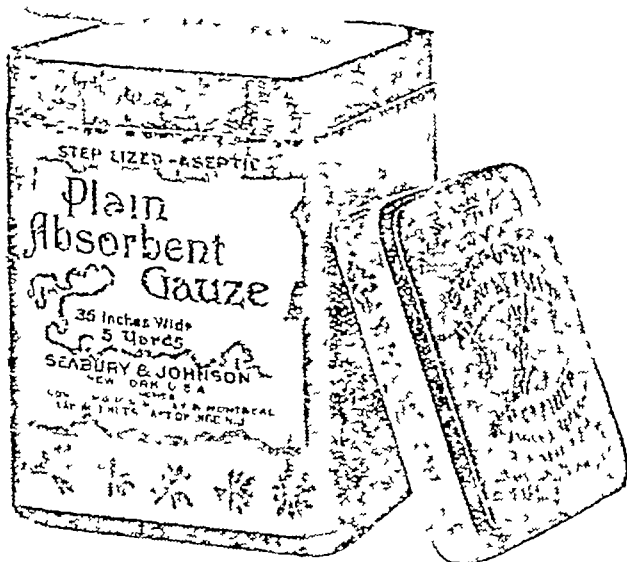
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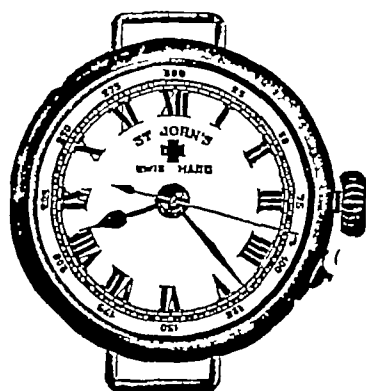
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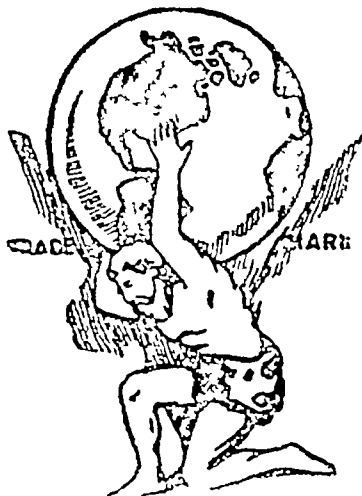
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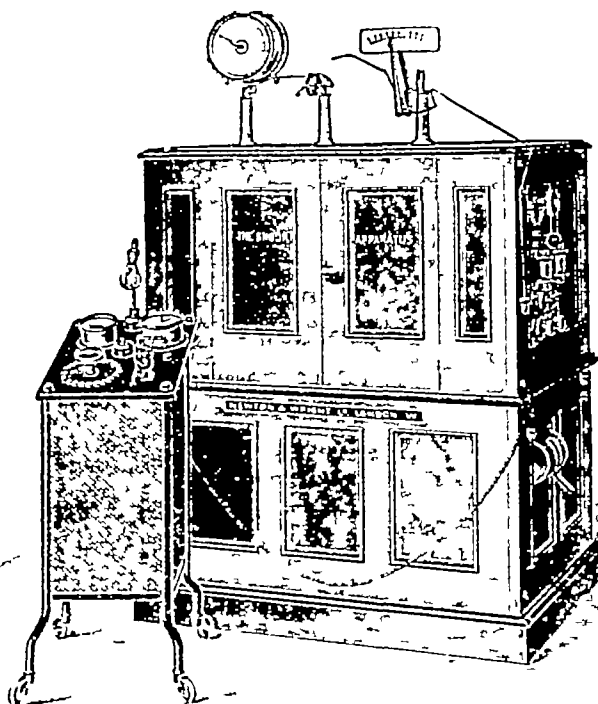
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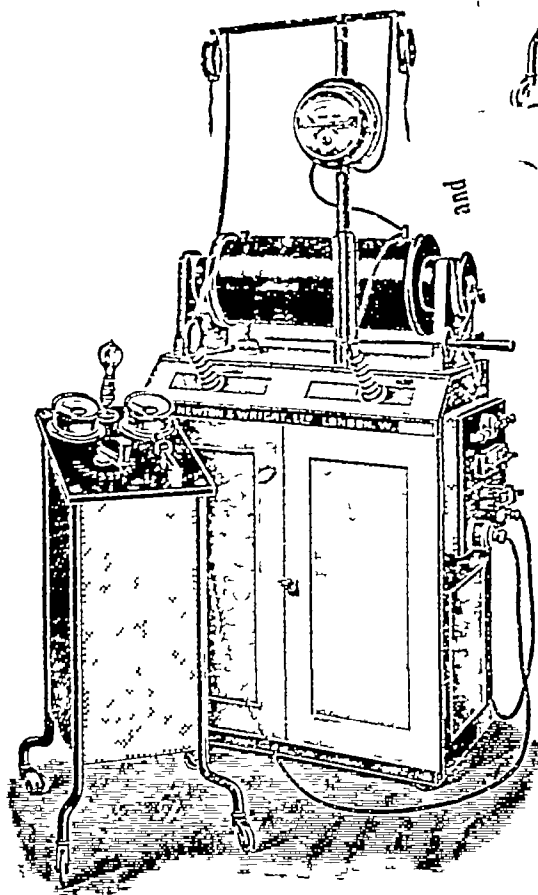
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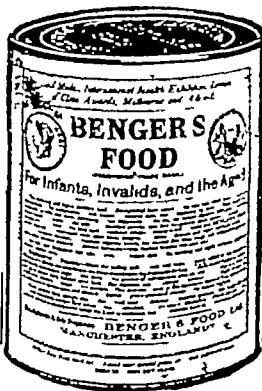
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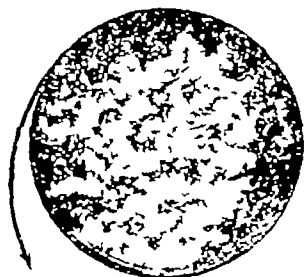
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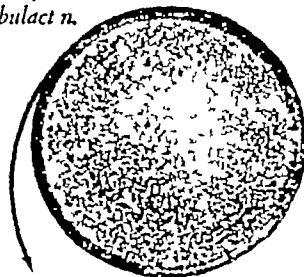
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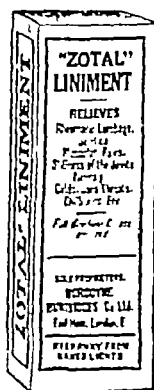
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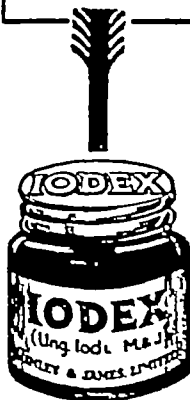
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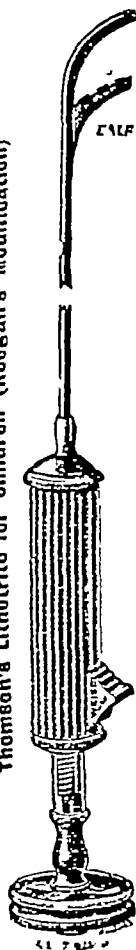
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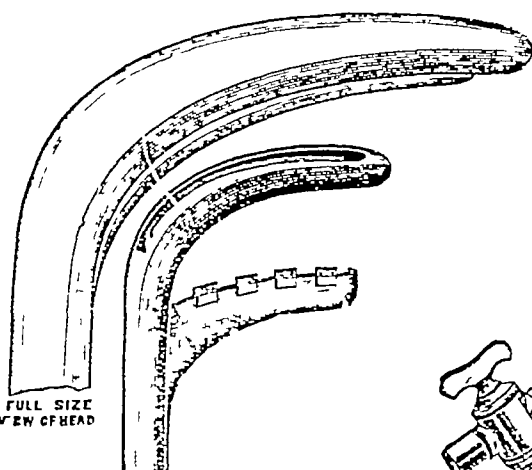
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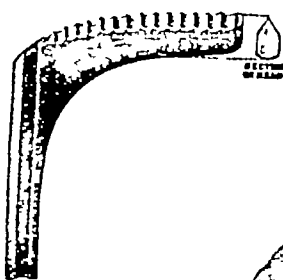
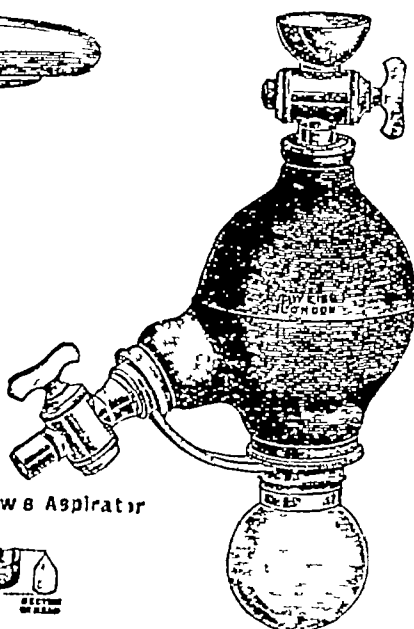


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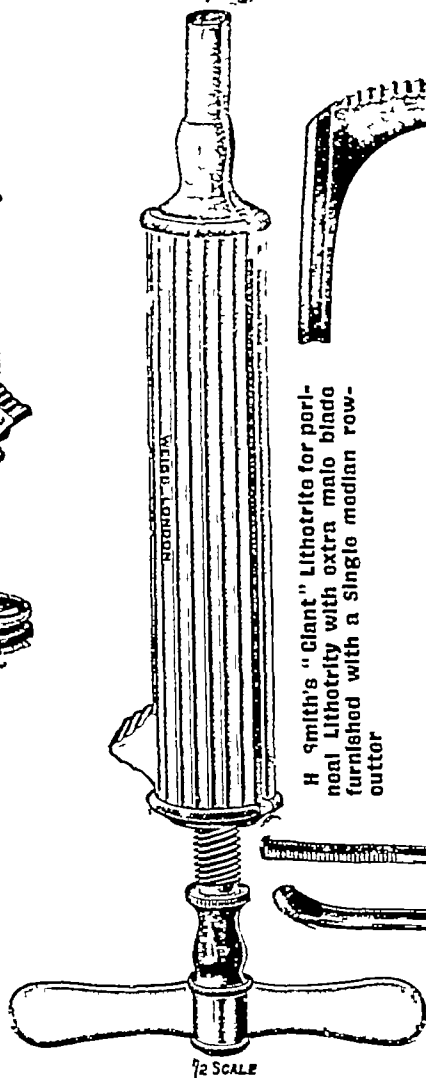
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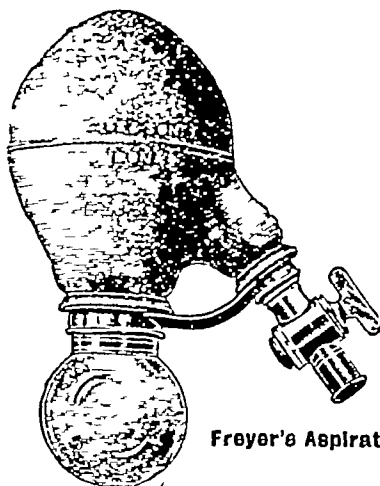


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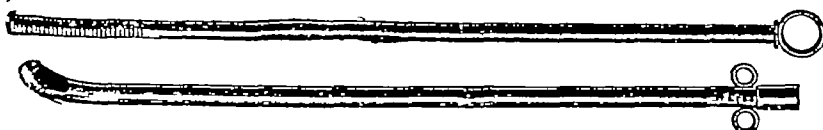
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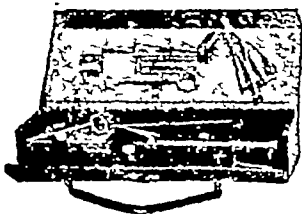
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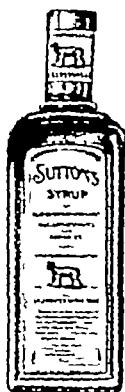


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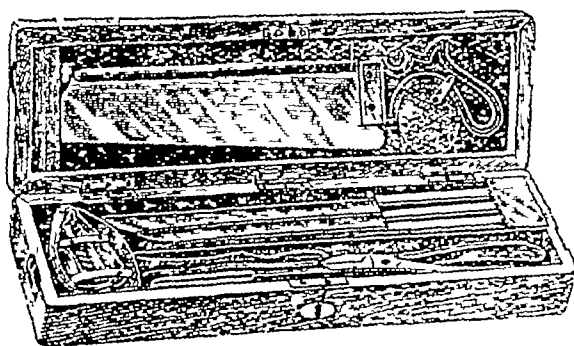
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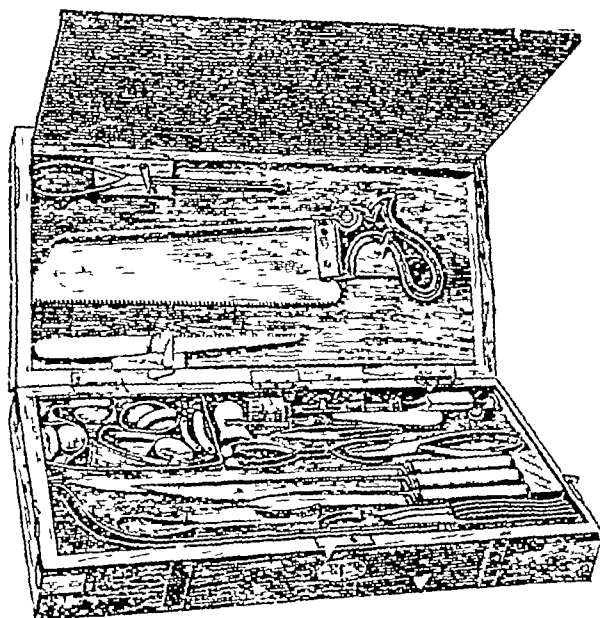
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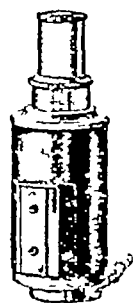
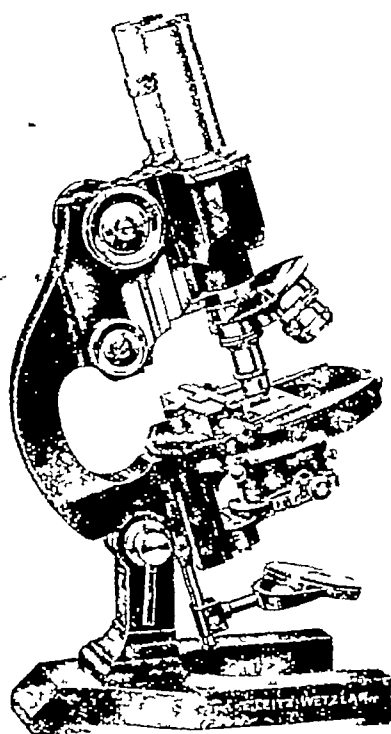
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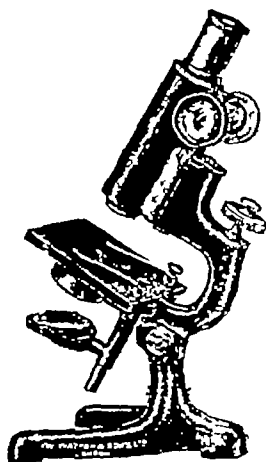
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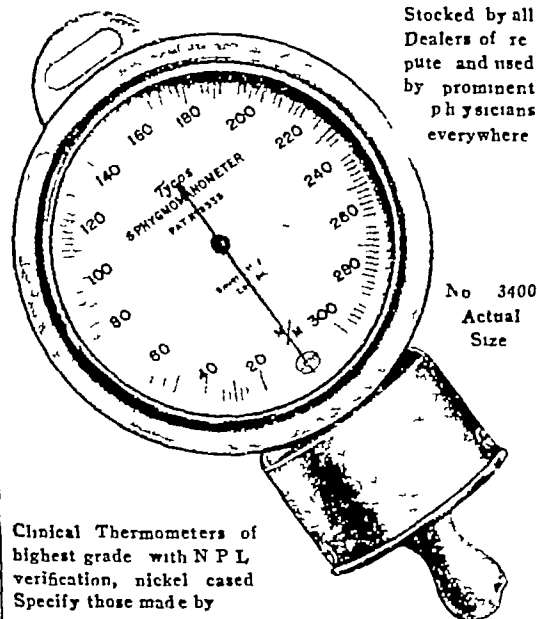
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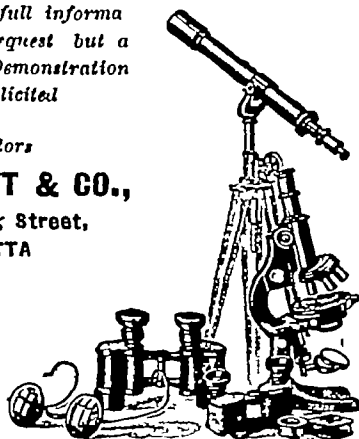
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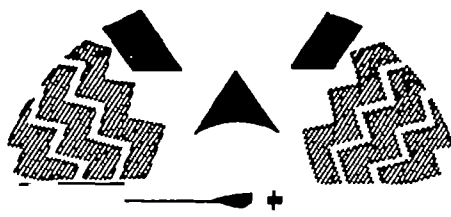
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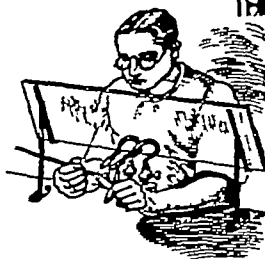
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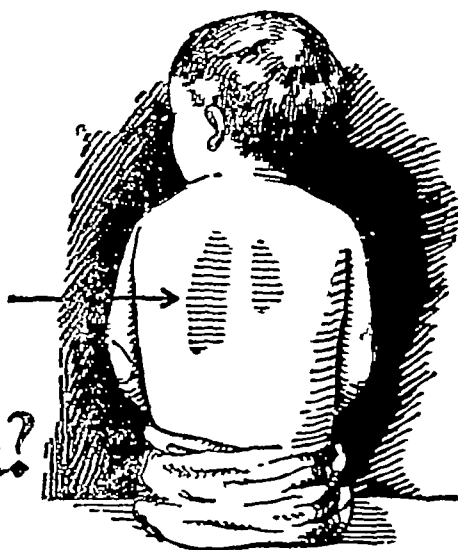
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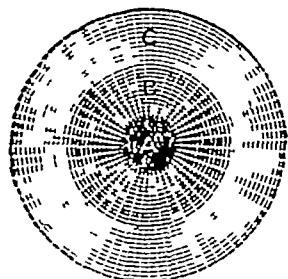
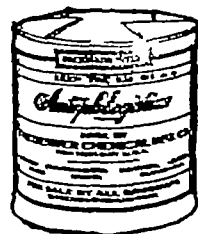


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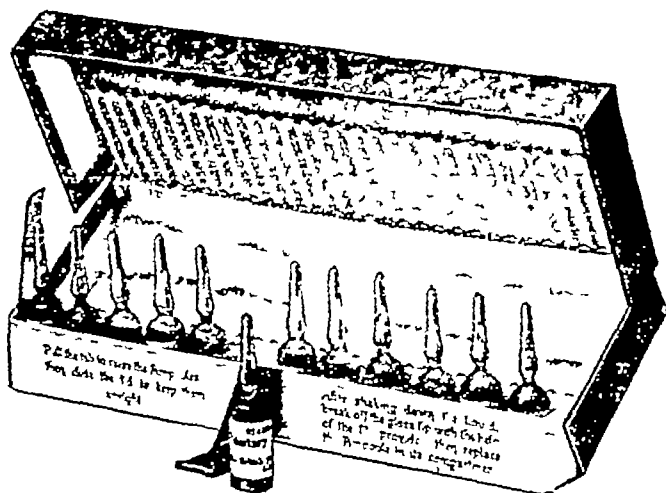
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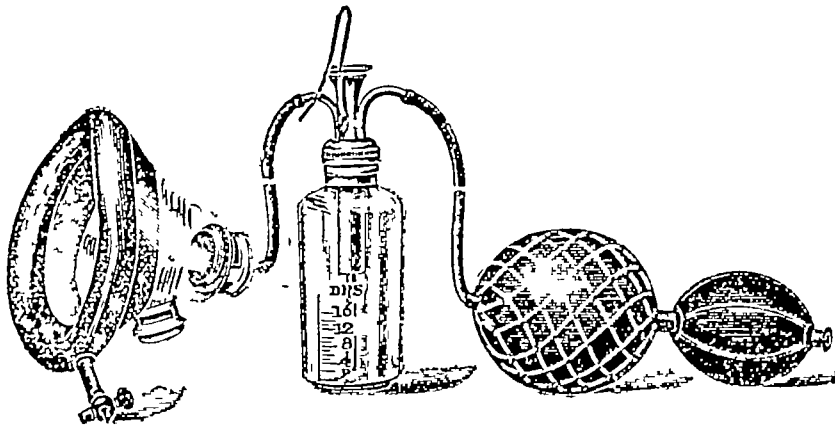
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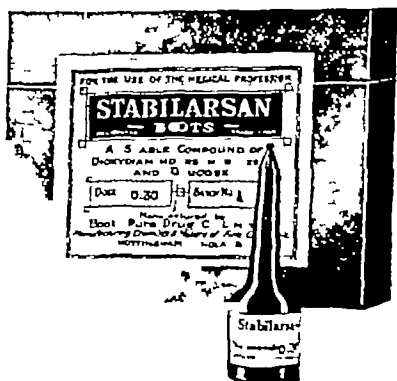
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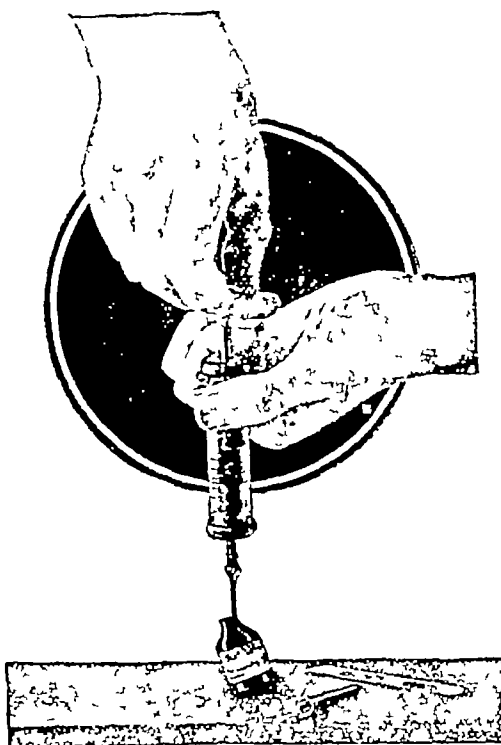


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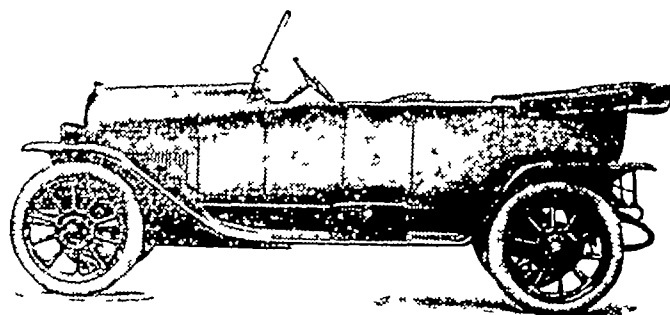
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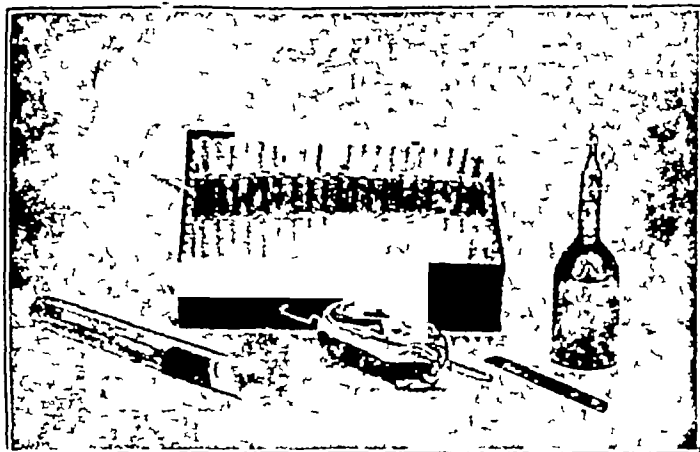


Fig 1

## THE OUTFIT (Fig 1)

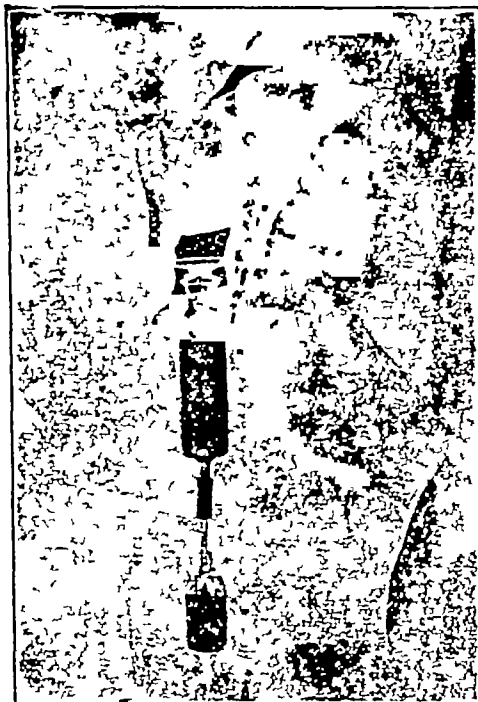
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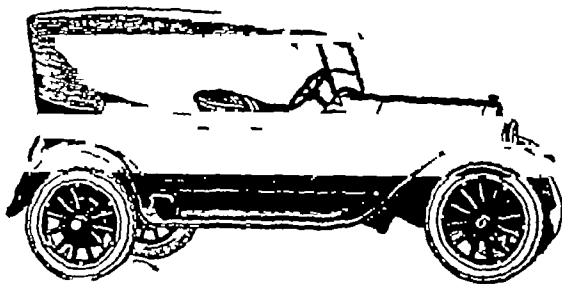
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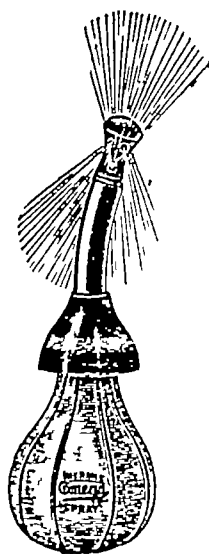
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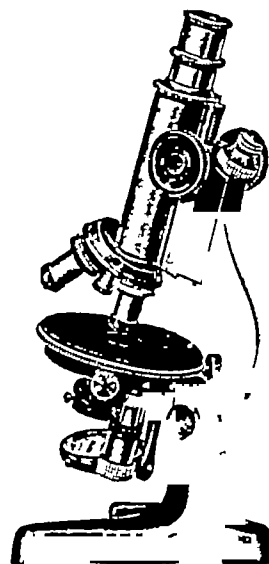
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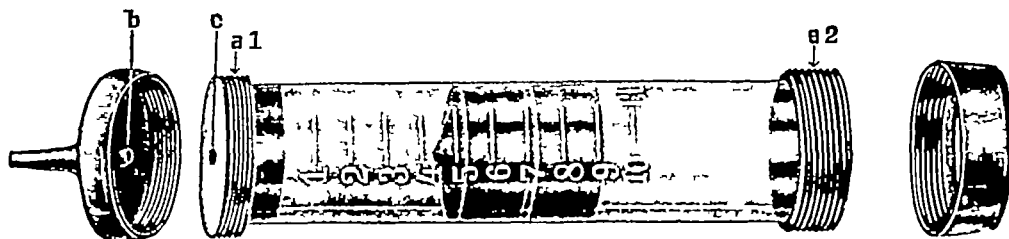
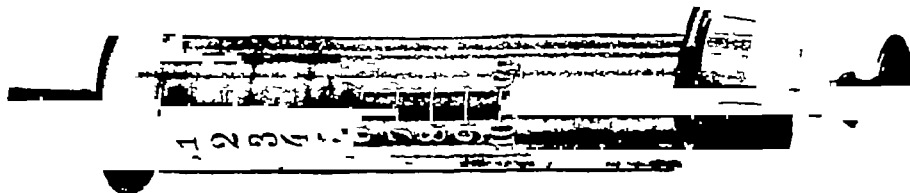
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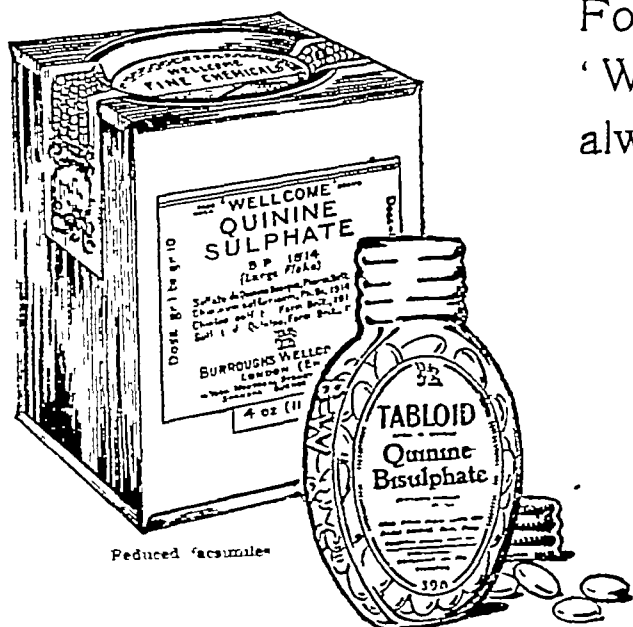
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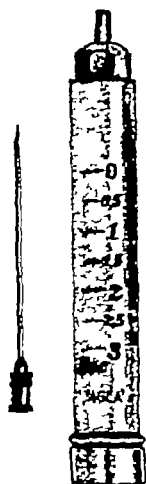
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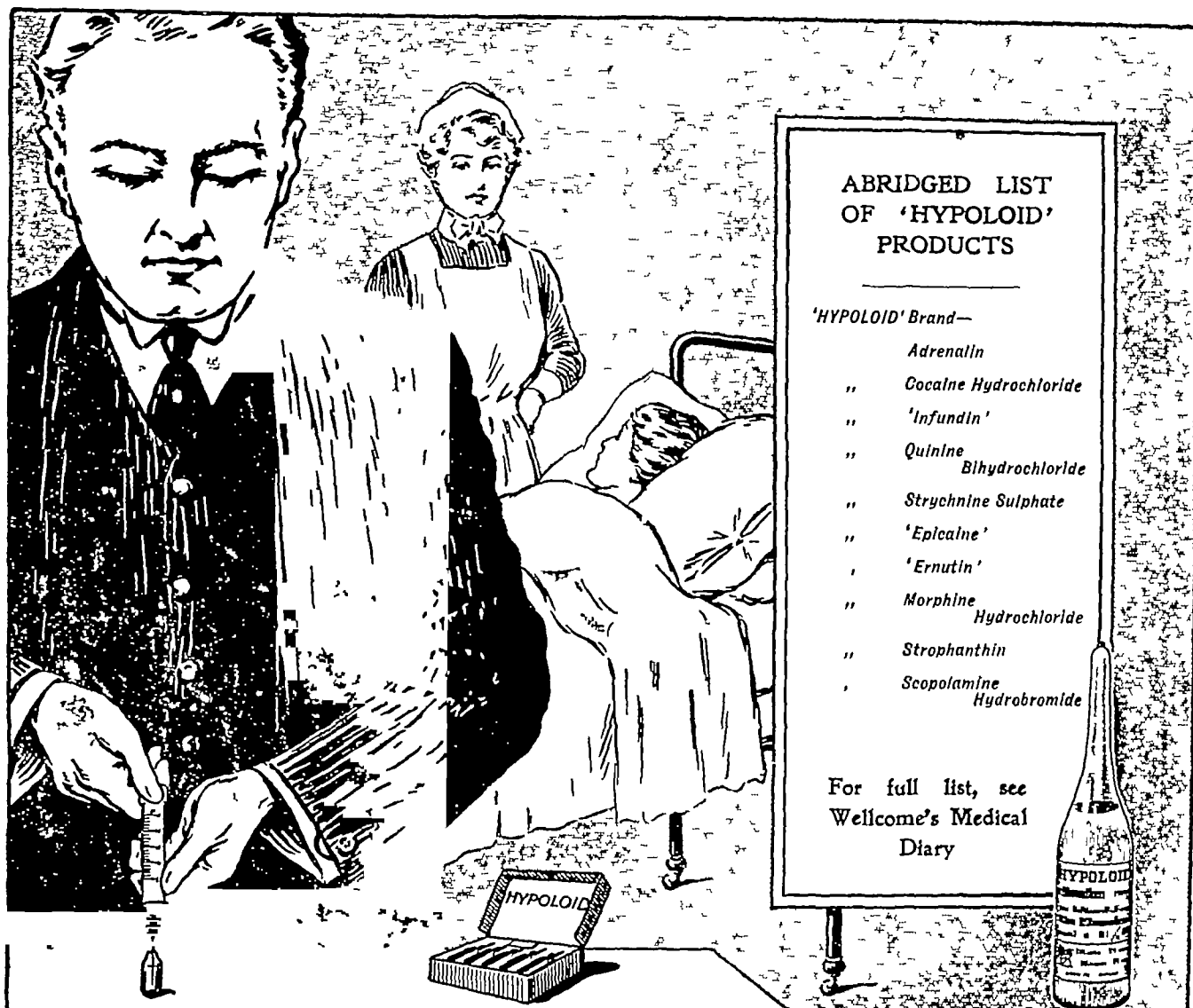
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## Original Articles.

### NOTES ON MALARIA IN SHILLONG

By T C McCOMBIE YOUNG, M D D P H ,

LIEUT COLONEL, I M S ,

Director of Public Health Assam

In 1922, the question of malaria in Shillong began to attract an increasing amount of attention. The Civil Surgeon was impressed by the number of cases he had seen which were almost certainly acquired in Shillong, and the existence of a malarious belt along the banks of the Umkhrah was suspected, as cases, presumably of locally acquired malaria, were known to have occurred at times in certain bungalows in the Umkhrah Valley and elsewhere. Accordingly the Municipality was approached for the provision of a staff to work under my direction to secure the necessary detailed information, and the entertainment of a trained insect collector was sanctioned, who commenced work in August 1922. His duty was to make a systematic search of all potential breeding grounds for anopheles larvæ. His daily catch was hatched out and identified in the Public Health Laboratory, the accuracy of his observations being checked by me every Saturday when in the station, by visits to the places in which he had found larvæ.

A year's observations have now been completed and a very large number of anopheles' breeding grounds (239) have been discovered.

Major Shortt, I M S, on an interesting paper in the January 1924 number of the *Indian Journal of Medical Research*, has dealt with the systematic and epidemiological aspects of the case, and it remains for me to deal with the detailed survey and its practical applications. These observations seem to support Major Shortt's conclusion that, from a practical point of view, it is only the breeding grounds of *A. maculatus* with which we need be concerned. The larvæ of this species of mosquito, which is a most potent vector of malaria in certain malarious areas in the plains of Assam, after the onset of the rains and until their cessation, can usually be found in greater or lesser numbers in sedgy water-logged grass situated below the seepage line in nullahs whose drainage is obstructed. These are naturally most common in the valleys of the following streams—the Um Shirpi, the Umkhrah, and its tributaries particularly the Pomdingim. These breeding grounds during the rains are to be found throughout Shillong, although the number of these areas whose quantum of

production is probably dangerous, is fortunately small.

The anopheline year in Shillong is conveniently divisible into three different seasons—

I The cold weather season from the cessation of the rains in October until March. During this season, large numbers of a big handsome mosquito, *A. gigas* can be collected and its favourite habitat is clear rocky pools, or perennial springs. This mosquito is only found in the hills and its seasonal prevalence is at a time when the temperature of the air probably precludes the possibility of its becoming infected with the malaria parasite, and nowhere has it, to my knowledge been suspected of being a carrier of malaria. Its presence is, therefore of only entomological interest. Towards the end of this period *A. attem* appears, but in limited numbers.

II The hot dry months—During these months, only the beds of the streams act as breeding grounds, and in them, *A. maculatus* is the common mosquito. During 1923, *A. maculatus* larvæ began to replace *A. gigas* in May, the first *A. maculatus* larvæ being collected on the 25th May, 1923, but in other years, I have repeatedly found larvæ of this mosquito in the streams in April, which is probably the month in which its prevalence normally dates.

At this time of year the optimum conditions for *A. maculatus* seem to be found in a rock-bound sandy pool cut off from the main stream by the fall of the water level, and the absence or otherwise of these larvæ is determined by the scouring out of such pools by storm water. This year 1923, has apparently been a comparatively healthy year with regard to malaria, and this I would attribute to the early rains in the spring which repeatedly scoured out the pools and retarded the propagation of *A. maculatus*. This observation lends support to the views of old residents who maintain that early rains clean up the town and make it more healthy.

III Rainy season—With the advent of the rains, flood water scours out the streams rivulets and drains at frequent intervals, and prevents breeding in them to any appreciable extent. *A. maculatus* then seems to betake itself to swampy ground fed by seepage water and springs in the valleys, of which despite the clearance of the station and attempts at drainage of such areas, there is a surprising number. Some of these during the rainy season are regular swamps, and they vary in size and potentiality for evil from little patches of moist grass, fed by seepage water on hill sides above a road, or beside a football ground, to fairly large swamps. When the rains cease or slacken, and before the temperature has fallen below a point at which the hot weather species cease to breed, the surface drains of the



station may, for a short time, act as breeding grounds of *A. maculatus*. For example a length of drain below Pinemount School in the nullah between it and 'Hopedale,' 'Avondale' and 'Brightwells' was in October 1922 breeding *A. maculatus* in fairly large numbers and may have been responsible for a case of what was probably locally acquired malaria in the Chief Secretary's house. By November the 1 *maculatus* season is practically over though a few larvæ can still be recovered from the pools in November and December, and *A. gigas* whose larvæ began to appear in the pools in October now monopolises the breeding grounds, and remains in almost undisturbed possession of them until May, when *A. maculatus* first appears, *A. gigas* disappearing altogether in June.

Adult anophelines were caught at various times in cowsheds and servants' houses but in scanty numbers. The species so caught in the course of this investigation were *A. maculatus*, *A. gigas* and *A. fuliginosus*. The latter species is suspected elsewhere of being a carrier, but those caught were found only in cowsheds, the larvæ are few and its presence may probably be ignored in reckoning up the factors which make for the malariousness of Shillong.

The rice fields which abound in and around the station were carefully watched. In May, June and July, along with the predominant species breeding in this environment (which is the presumably harmless *A. sinensis*), a few larvæ of *A. maculatus* were constantly recovered in the course of this investigation, and in Major Shortt's paper he records the capture of *A. maculatus* from rice fields in the end of 1922. While the numbers so collected at any one time are few, the total output of *A. maculatus* from the rice fields in the Umkhray Valley while the rice is being irrigated must be considerable, and proximity to these rice fields may be a factor in the malariousness of the houses above the Umkhray Valley, although fortunately it is not the only factor.

A rice field which is lying fallow, and is full of sedgy water-soaked grass and weed, is, however, a prolific breeding ground of *A. maculatus*. Besides *A. maculatus*, *A. gigas*, *A. fuliginosus*, and *A. sinensis*, other anophelines which have been collected and identified in the course of this enquiry are *A. aithem*, *A. lindsayi*, *A. willmori* and *A. vagus*. All except *A. aithem* were scanty, and all of them are only of entomological interest. At no time was *A. minimus* which was collected by Major Shortt, seen by me in the course of this investigation, and as this anopheline is a potent vector of malaria, it is fortunate that it appears to be scanty.

The culicine fauna of other collections of water may be worthy of mention in this note, although they are without bearing on the malarial question. *Aedes* mosquitoes, an active and persistent species, breed in the

cut ends of bamboos and in fire buckets and other collections of clean domestic water, and are a domestic pest, while a half-filled manure pit, with rain water standing in it, often contains culicine larvæ by the thousand, in fact, experience shows that one is usually justified in assuming that when a householder complains of the number of mosquitoes in his bungalow it is because he is breeding them on the premises in some such collection of water.

While it would be superfluous to describe all of the 239 breeding grounds observed, the more important of these should be dealt with by drainage and the detailed recommendations for the drainage, by contour drains, of seepage areas and swampy ground which serve as breeding grounds of *A. maculatus*, are omitted, being of only local interest.

Although the anopheline breeding grounds are so numerous and scattered everywhere throughout the station, gardeners will be glad to learn that the irrigation channels have not, at any time, been convicted of breeding mosquitoes, and the presence of these channels in the station is no way inimical to its health.

I think it can fairly be assumed that the prevalence of malaria in Shillong is not such as to impair its economic efficiency and social amenities, and that as a commercial proposition, no large expenditure is justified. I do not, therefore, recommend any drastic and expensive anti-malarial measures, but I would advise that the sodden ground and the swamps to which I have referred should be dried by appropriate measures of drainage.

From a study of the literature of anti-*maculatus* measures elsewhere, I am strongly of opinion that these measures of drainage must be the provision of contour drains along the side of the valleys at the seepage level, and if these prove satisfactory, they might eventually be made into subsoil drains, as experience elsewhere has proved that by this method of drainage a marshy nullah can be made bone dry. There is, however, the difficulty that such subsoil drains entail rather heavy maintenance charges.

The exact details of these operations may be left to the Executive Engineer, and I will say no more than to add a word of caution against taking the line of least resistance, and digging a central drain down the centre of the nullah. This may lead off storm water and some of the seepage water, but it does not prevent mosquito breeding in the wet areas that remain on each side of it, and this method of drainage will not result in appreciable reduction of anopheles breeding which is the object of the measure.

The question of personal prophylaxis is probably more important in Shillong than

engineering operations. In view of the probability that the rice fields in the Umikhrak Valley can produce an appreciable and probably dangerous number of *A. maculatus* from April or May until the end of October, residents of houses situated on the heights above the stream would probably be well advised to protect themselves by the use of mosquito nets at night during these months.

Within the station, however, and especially if the minor improvements which I have suggested in the valley of the Ka Wah Pomdingum and elsewhere are effected, it would appear as if the chances of acquiring malaria in Shillong are so slight as to be negligible and to demand no special personal precautions.

### MALARIA ON AMBOOTIA TEA ESTATE NEAR KURSEONG AND THE SUCCESS OF SOME ANTI-MALARIAL OPERATIONS

By C STRICKLAND M.A. Bch (Cantab.),

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THE malariology of hill-stations is an important subject, for visitors do not go to them to spend their holiday abed with fever. Any contribution, therefore, to our knowledge of the subject may be helpful.

The observations now recorded were made in May 1923 during a visit to Ambootia Tea Estate Kurseong about 3000 feet above sea-level in the Eastern Himalayan foothills. They indicate the salient factors which determine malaria incidence on the estate, and their analysis throws into relief the effect of the anti-malarial operations which had been initiated with uncommon enterprise by the Manager Mr A. O'Brien-Webb, at the instigation of the Visiting Medical Officer, Dr Kingsley-Ward. The nature of the operations was mainly the drainage of swamps and training of streams.

In the course of the work the first point considered was whether the rainfall had anything to do with the malaria-rate. Generally speaking when a malaria-rate corresponds with a moderate rainfall one would incriminate swamp-breeding anophelines, while if such data have an inverse relationship stream-breeders might be suspected, the reason being that heavy rains scour out the breeding places and so diminish the sources of malarial infection. This has been emphasised by Perry (1914) with reference to the Jeypore hill-tracts.

The estate records which were necessary to decide the point had been in charge of the Medical Officer of the estate and the conclusions submitted are drawn from the analysis of those from 1917 to the present time.

A chart drawn to show the rainfall, the case-returns, and the case-rate (i.e. the number of cases per cent of population) every year, and also these data computed for the 12-monthly periods from June to May revealed no direct correlation in them, indeed, between the incidence and the rainfall there was a tendency to inverse correlation (Chart 3). There was, however, no doubt about the inverse relationship if the data were compiled for the period January to May of the year, and the inversity was also evident in the June to December period (Charts 4 and 5).

These findings then indicate that the pathophors here are stream-breeders, and this conclusion is supported by the fact that the writer had much difficulty in capturing any stream-breeders after the fall of several very heavy "chota-monsoon" showers just previous to his visit, and that "swamp-breeders" were absent.

The circumstance of the inversity, within any period of case-rate to rainfall does not give much scope for predicting the severity of the epidemic season but a good means of prediction was discovered by charting yearly rainfalls against case-rates for the period January to May following during which the epidemic becomes well established. It then appeared that the greater the monsoon rainfall any year, the less the case-rate in the epidemic season next year. Marjoribanks (1914) referring to malaria on Salsette Island has averred the same fact in his statement that "a dry year followed by an ordinary year causes an increase of malaria-incidence". Christophers (1911) and Gill (1922) have recognised the general importance of being able to predict malaria epidemics, in setting forth the factors conducing to them in the Punjab.

Incidentally the fact that on Ambootia Estate a heavy monsoon year is followed by a light epidemic year, proves that on these slopes seepage of subsoil-water for months after the monsoon does not occur to any extent. If it did one would feel sure that there would be a rich legacy of dangerous spring-water breeders such as *A. maculatus* causing much trouble long after the rains cease but this is not the case. Probably the decomposed micaceous granite soil here is so porous that water flows away through, almost as readily as over, it.

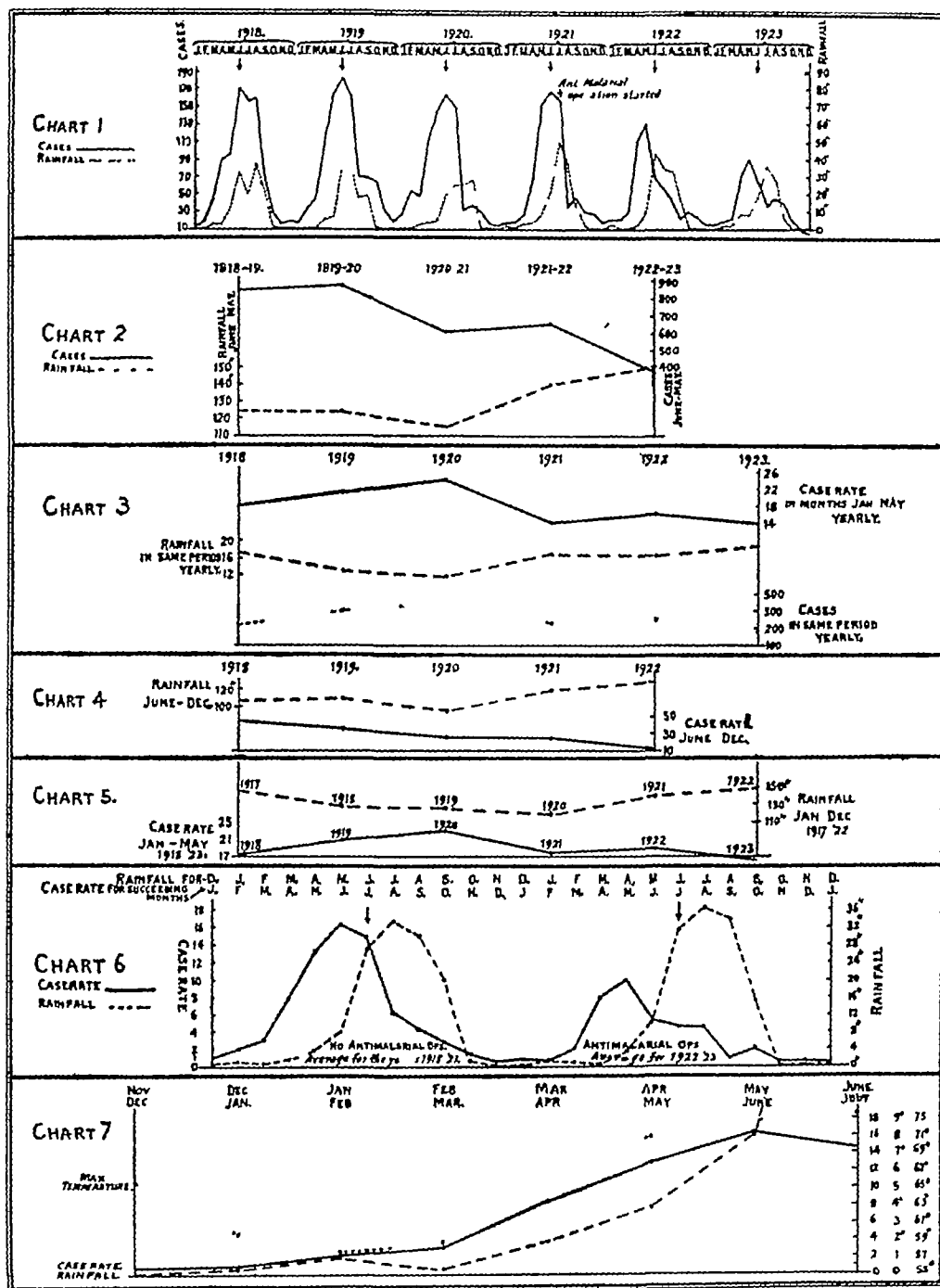
The relationship between rainfall and malaria was further analysed in Chart 7, where the monthly records from 1917 to 1923 are given. Apart from any question of rainfall-malaria correlation it must be observed in this chart that subsequently to March 1922, when Mr Webb started his anti-malarial operations (as noted above) the improvement of health was immediate and

sustained The reason for this was probably the fact that the troublesome mosquitoes, being stream-breeders, had been subjected by means of the operations more than naturally to the force of the "chotamonsoon" showers

The monthly data have been condensed in Chart 6 into two periods, first for 1918-21 and then the years 1922-23 during which anti-

Chart 7 giving also the temperature records, —leads to the following conclusions —

(a) In the pre-monsoon period, from November to February inclusive, the malaria case-rate of the succeeding month goes up independently of both the monthly temperature and the rainfall Probably the slight rise in case-rate is here due to recurrences induced by cold and exposure



malarial operations have been in progress, but in this chart rainfall has been apposed to the malaria incidence of the subsequent month for the reason that the development of the mosquito and its malaria parasite and its incubation in man takes a month or more to complete A study of the chart and also of Chart 7 which gives the same data on a larger scale (for the early months only),—

(b) After February until May the same data are very closely correlated,

(c) which proves that the rising rainfall with its tendency to depress the case-rate is counterbalanced by some other factor, and this is probably, at this time of year, the rising temperature

(d) After the monsoon breaks, the great increase of rain in June and July, is responsible

for a rapid decline of malaria in July and August,

(e) which proves that the May brood of mosquitoes begins to die out by July, and that in general mosquitoes do not cause trouble by living long

(f) When the rains abate rapidly the malaria-rate falls less rapidly

(g) When anti-malarial operations are being carried on, as seen in the second part of Chart 6, the lighter increase of rain in May is responsible for a striking fall of case-rate in June or a month before normal

(h) The effect of anti-malarial operations has been to cause a general decrease of malaria incidence

In confirmation of the conclusion that the anti-malarial operations on Ambootia Estate have been effective in reducing malaria, the following facts may be cited—

Division A in 1921 had no operations and 122 cases in 1922 slight operations and 133 cases Whereas

Division B in 1921 had no operations and 56 cases in 1922 no operations and 112 cases

Further, Division C in 1921 had no operations and 185 cases in 1922 most intensive operations and 92 cases

While Division D in 1921 had no operations and 283 cases and in 1922 after operations 138 cases

The most important immediate factor in the situation must be the mosquito fauna and its habitat. That the mosquitoes causing the trouble are stream-breeders was the conclusion come to from the preliminary analysis given above, and those found on the estate were *A willmori*, *A maculatus*, and *A atkemi* the first two, of course, being very dangerous. Other species taken were *lindesayi*, *barbirostris* and *ragus*, while outside of the estate in stony pools of the bed of the Balasun river *A willmori* and *A maculatus* were caught in very large numbers

The Balasun flows in a valley 1,500 feet below the estate about three-quarters of a mile off as the crow flies and whether the valley was not a very great danger or not was a matter for serious consideration. Probably it is not, however, for one section of Division A of the estate with a spleen-index of 0.00 per cent is situated on a knoll directly above the river, nearer in fact than any other division

The main object of the observations was to localise the sources of danger on the estate and those made, it is hoped, will enable the Manager, Mr O'Brien-Webb, to complete the work which has already borne good fruit. To him, as also to Drs Kingsley-Ward and Winckler the writer owes thanks for the help received and he is also indebted to Lt-Col McCombie Young, I.M.S., for his useful criticism of the draft report

## SUMMARY

An analysis of the malaria-rate with possible contributory factors on Ambootia Tea Estate near Kurseong, Eastern Himalayan foot-hills, leads to the conclusion that the amount of rainfall bears an inverse relation to the malaria-rate at all times of the year. Probably the most important factor in the production of the annual epidemic in the spring months is a rising temperature.

The inverse relationship of the rainfall indicates stream-breeders as pathophors, and *A maculatus* and *A willmori* being found everywhere, should be incriminated with causing the trouble.

The inverse of the rainfall to the malaria-rate also provides a means of predicting the severity of the latter. But a better method was found by showing that the severity of the monsoon is inverse to that of the epidemic in the next year.

The seepage of subsoil water for months after the monsoon is not a factor of importance in affording habitats for the pathophors, nor is the continued existence of any brood of mosquitoes. A breeding ground of *A maculatus* and *A willmori* at a distance of about 1,300 yards and 500 yards vertically below is of no economic importance.\*

Anti-malarial operations started at the instigation of Dr Kingsley-Ward by the Manager, Mr O'Brien-Webb, have been very successful. They prove that the drainage of swamps and training of streams in which *A maculatus* and *A willmori* breed are effective anti-malarial measures, though complete success from their employment is not to be expected. Not only have they reduced the malaria-rate, but this has fallen rapidly a full month before the normal fall would take place. Mr O'Brien-Webb should be congratulated on his good work.

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## PRELIMINARY NOTES ON THE USE OF A SENSITISED ANTI-PLAGUE VACCINE

By C. J. STOCKER, M.C., M.A., M.D., D.T.M. & H.

MAJOR, I.M.S.,

and

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MAJOR, I.M.S.

It is a matter of great regret, though perhaps not surprising, that sensitised vaccines

\* Watson in Malaya has found that breeding places of the strong flier *A umbrinus* at a distance greater than a quarter of a mile are of no economic importance.



50 million were used, given on successive days, but it is recognised now that this procedure was too timid. It is now recommended that the initial dose should be nearer 50 million for an adult and no ill results need be apprehended. No ill effects were experienced in any case, either local or general. Even children of 12 years took the larger doses as well as adults. Indeed, in a disease like plague there is every reason for pushing the vaccine as rapidly as possible, as a fatal issue is often only a matter of a few hours. It is anticipated that much larger doses will eventually come to be used as a routine. Needless to say it should be given as soon as possible after diagnosis.

*Results*—In dealing with the results of inoculation only the Mardan epidemic will be considered here not because it has not been tried elsewhere but because all the cases were treated under more or less the same conditions and therefore the issue is less likely to be confused by other factors. It is unnecessary to state that no really valuable conclusions can be drawn from the few cases quoted here but the figures have a value as an indication of the sort of result that one might obtain if the vaccine were tried on a larger scale and it is in the hope that some one with better qualifications and opportunities than the authors will do so next spring that this article has been written.

In trying to estimate the value of the vaccine a number of different factors have to be taken into consideration. The most important of these is undoubtedly the effect of prophylactic inoculation. There can be no question that the severity of the disease is enormously reduced in those persons who are unlucky enough to contract the disease after inoculation. Other factors are proper nursing and feeding in a hospital as opposed to the usual village hovel, coincidence the effects of intercurrent disease in which the vaccine was peculiarly unfortunate, and lastly the effects of other forms of treatment. Some charts have been altogether cut out of the series owing to the impossibility of excluding these other factors, in every case their inclusion would have made the results of the vaccine more striking so that the authors should not be accused of too much optimism.

The figures for this particular epidemic work out as follows—

(a) Of those who were *not* prophylactically inoculated and who *were* treated with the sensitised vaccine—5 died out of 17=29.4 per cent.

It should be pointed out, however, that of the five deaths, one aborted and died of (?) heart failure three days after the temperature had come down to normal following the use of the vaccine, two had pneumonia as a complication and one died within a few

hours of receiving the first and smallest dose, being practically moribund on admission.

(b) Of those who were *not* prophylactically inoculated and who *were not* treated with the sensitised vaccine—11 died out of 18 = 61.1 per cent.

(c) Of those who *were* prophylactically inoculated and who *were* treated with the sensitised vaccine—1 died out of 12 = 8.3 per cent.

(d) Of those who *were* prophylactically inoculated and *were not* treated with the sensitised vaccine—the mortality was 12.5 per cent.

The figures given under category (d) were taken from a text book and not from the epidemic under consideration, they are put in to make the parallel more complete.

The authors are specially indebted to Asst Surgeon D'Silva who carried out all the manipulatory part of the manufacture of the vaccine and also to the A D P H of the N W F Province in whose laboratory the vaccine was made. They are also very greatly indebted to Capt H K Datta, I.M.S. and S A S Vadara who very kindly supplied the charts and notes on the cases.

#### Illustrative Cases

*Case No 1*—Faquir Hussain, private case, aged 12. *Not inoculated against plague*. Bubo in the left groin. He had been ill three days when first seen and was in great pain and very drowsy. The bubo suppurated and was opened on the 9th day. There was no local reaction to the vaccine. Other routine treatment was given. The patient recovered.

*Case No 2*—Ali Zaman sepoy, 2nd Guides, aged 20. *Not inoculated against plague*. Patient's condition on admission was fairly good. His temperature came down very soon. There was no local reaction to the vaccine. He was given routine treatment in addition. The bubo suppurated.

*Case No 3*—Wife of private case, aged 38. *Not inoculated against plague*. Had fever first on 20th October 1923 and slight pain in the left groin. Bubo appeared on 21st October 1923. The pulse on my visit was quick and of moderate volume and tension. The patient was put on brandy and cardiac stimulant mixture, and equal parts of tinct and lint iodine applied locally. After the first dose of sensitised vaccine the pulse became stronger and less frequent. After the second dose the restlessness experienced at night diminished. Tinct iodine 5 was injected into the bubo. After the third injection of the vaccine the pulse was much stronger and less frequent than before, and the temperature came down by lysis. Later on she used to get a slight temperature in the evenings, quinine grs 10 tds was administered, she recovered.

She developed another bubo above the first on the sixth day of the disease, which subsided of its own accord in three days' time. This did not cause any constitutional disturbance.

There was no local reaction to the vaccine.

*Case No 4*—Basak Ram, private servant, Guides Cavalry, aged 18. *Not inoculated against plague*. Patient's condition was fairly good on admission. He showed much improvement after the second dose of vaccine. There was no local reaction. The bubo subsided without suppuration. Other routine treatment was also given. The patient recovered.

*Case No 5*—Nahil Singh sepoy, 1st Guides, aged 21. *Not inoculated against plague*. Patient's condition on admission was not promising. The patient did very well with the sensitised vaccine, his general condition

minute amount of iodine present in the thyroid secretion and the results of the above-mentioned experimental work were encouraging

Ever since 1913 the use of intravenous iodine has become one of the routine methods of treatment of surgical cases of sepsis in my wards, and particularly of such grave cases as gas gangrene, severe streptococcal infections, etc. It is very hard to build up statistics of any value in dealing with such cases. Some of the worst cases recover under any ordinary method of treatment, while some will die in spite of all the methods at our command. At the same time my clinical experience has confirmed my conviction that the intravenous injection of iodine is of value in the treatment of these cases.

During the year following my initial experience of the iodine treatment for plague, the beneficial effects of very small and frequently repeated doses of tincture of iodine by the mouth were widely circulated in the newspapers. This was done, if I am not mistaken, at the instance of some of the workers in the Salvation Army. What the results of this treatment were, I am not in a position to say.

In my own experience of the last ten years, I have not been tempted to increase to any extent the amount of iodine injected at one dose. I have on many occasions increased the number of doses per day and have continued the treatment for several days at a time. It has always seemed to me that even small doses had a considerable effect and this is intelligible, considering the powerful stimulus which iodine exerts on the thyroid mechanism and probably on other less well-understood mechanisms of the body. Further experimental work is badly needed, as also an investigation into the actual bactericidal power of iodine in the blood of human beings suffering from septicæmic conditions, such as infectious fevers, pneumonia, anthrax, syphilis and many more. My own experience has been almost entirely clinical and has been confined for the most part to so-called surgical cases of grave sepsis.

I was extremely interested to read the results of a great deal of independent work done by Lt-Colonel W. W. Jeudwine, C.M.G., I.M.S., on this identical subject (*Indian Medical Gazette*, December 1923). We badly need more clinical work of this kind and work in the pathological laboratory also.

Jeudwine has employed intravenous iodine for a large number of affections, most of which have been what would be described clinically as of "septic" origin. He is evidently much impressed with the value of the treatment. He describes some of the

details of his technique in administration and mentions certain difficulties, such as local thrombosis, pain, reaction, iodism. He tells us how most of these can be avoided. I can find no mention of the effects of this method of treatment on syphilis in any of its stages. Considering the marvellous effects of potassium iodide on some of the manifestations of syphilis, intravenous iodine may well be worthy of a trial.

I am informed that no beneficial effects have so far been obtained in cases of kala-azar and of malaria by employing this method of treatment. The long-continued leucocytosis, referred to by Jeudwine, was not observed in these cases.

My object in writing this paper is to draw the attention of other workers to the possibilities of iodine, used in this direct manner, in the treatment of disease. My own knowledge and experience are insignificant and are offered only as a small contribution to the subject.

In the discussion on Colonel Connor's paper Major H. W. Acton, I.M.S., pointed out that one grain of iodine diluted in 5 litres of blood could not possibly act as an antiseptic. He considered that Colonel Jeudwine's results were largely hit and miss. Where hypothyroidism was present, the iodine injected supplemented a deficiency, stimulated the production of thyroxine, and was thus of great benefit. The types of appendicitis, for instance, could be classified into (a), those with hyperthyroidism, where there ensued a hyper-leucocytosis and abscess formation, and (b) those with hypothyroidism, where there was no such leucocytosis, and where gangrene often set in. He had recently been studying the action of pressor bases in animals who had been deprived of the thyroid gland and the results were of great interest. Thus some bases which often acted for only 3 to 4 minutes in the presence of the thyroid, might act potentially for from 10 to 15 minutes in its absence. Probably the intravenous iodine action was related to the thyroid mechanism.

Dr. Bepin Gupta would substitute "endocrinism" for other treatments, try iodine intravenously in kala-azar, and considered that the Mount Everest expedition owed its success—or want of it—to the fact that its members wore beards which protected their thyroid glands!

Dr. U. N. Brahmachari said that he had tried iodine (Iodo-injectule, Robin) intravenously in kala-azar with complete failure. On the other hand he had had encouraging results with it in influenzal septicæmia and in post-influenzal pneumonia. Also with Crook's colloidal iodine intravenously.

Major R. Knowles, I.M.S., stated that intravenous iodine had been tried in cases of kala-azar and of malaria at the Calcutta School of Tropical Medicine, with completely disappointing results. There was no evidence of the hyper-leucocytosis mentioned by Colonel Jeudwine, as a result.

Lieutenant-Colonel J. W. D. Megaw, I.M.S., pointed out that the doses used at the School in these cases had been only 10 to 20 minims of the tincture, and considerably smaller than those advocated by Colonel Jeudwine.

In summing up the discussion, Colonel Connor said that the claims for the drug in septic conditions were very interesting, but obviously much further study was needed. For instance, if its activity depended upon the thyroid mechanism, small doses might be better than large ones.

## LIVER FUNCTION TESTS AND CARBON TETRACHLORIDE

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VARIOUS methods have been described from time to time for testing the functional activity of the liver. It is not the object of this paper to describe all these in detail. There is, for instance, among others, Rosenthal's method(1) of testing liver function by injecting phenol-tetrachlor-phthalein and studying its rate of disappearance from the blood stream. The liver is practically the only organ that excretes this dye, and when the liver is normal, the rate of disappearance of phenol-tetrachlor-phthalein is quite rapid. This method was given an extensive trial by later workers such as Kahn and others, but their reports show results which are conflicting and this method has consequently not met with extensive clinical application.

Salicylic acid has also been used for testing liver functions, the results being based on the rate of its excretion in the urine. This test was given a fairly extensive trial by one of us (J P B), but the results obtained were not very encouraging.

Perhaps the first experiment on testing the functional activity of the liver based on one of the most important functions that the normal liver has got to carry out, viz., the glycogenic function, was started by de Fellipi (2).

He found that when the liver was shut out from the portal circulation, there was a small decrease in tolerance for dextrose but a larger decrease in tolerance for lævulose.

Jacobson(3) repeated these experiments on dogs and got the following results —

	Before operation	After operation
Tolerance for dextrose	115 grammes	80 grammes
Tolerance for lævulose	90 grammes	9 grammes

Another sugar, galactose, was also employed by R. Bauer for chemical diagnosis of the condition of the liver in the living patient. It was found by experiment that when 30 to 40 grammes of pure galactose was given by the mouth to a healthy normal individual there was no galactosuria, but that in certain disturbances of the hepatic function an appreciable portion of it appeared in the urine. According to Bauer the test is positive in the various forms of cirrhosis of the liver in catarrhal jaundice, in phosphorus poisoning, in acute yellow atrophy and fatty liver in

tuberculosis, but in passive hyperæmia of the liver, in cholelithiasis, cancers, tumours, echinococcus disease and abscesses and in perihepatic affections it is said to be negative. This test has, however, the disadvantage that it is a urine test, and the threshold value of the excretion of galactose in the urine varies widely in different individuals.

Strauss(4) used lævulose as a test for liver function and found that 90 per cent of patients with diseases of the liver, such as cirrhosis, excrete lævulose after a dose of 100 grammes. In acute phosphorus poisoning about 85 per cent of the cases showed a diminished tolerance after a dose of 100 grammes. These experiments, however, suffered from the defect that the conclusions were based on the results of testing the urine for sugar only after the patient had received a large dose of lævulose by the mouth. Recent experiments on the increase of blood-sugar concentration brought about by the ingestion of carbohydrates point to the conclusion that the degree of hyperglycæmia produced is more important than glycosuria.

Bergmerk(5) in 1914 observed the effect of lævulose on the blood-sugar in normal individuals and found that practically no rise occurred after a dose of 50 grammes.

McLean and de Wassolow(6) repeated these experiments and found that a dose of 50 grammes caused a rise from 0.1 to 0.11 per cent which is within the limits of experimental error. These observers point out that the only sugar in ordinary use which did not produce a rise in blood-sugar concentration after its ingestion was lævulose, and they made use of this observation in testing the liver efficiency in various cases, on the supposition that a defective liver mechanism would result in lævulose hyperglycæmia.

One of us (J P B) experimented on himself on more than one occasion and found that there was no definite rise in the blood-sugar concentration after a dose of 25 grammes of lævulose. When plotted graphically, the blood-sugar curve was represented by a continuous straight line (Chart I, A). Of course a variation of 5 to 10 milligrammes per 100 c.c. may give rise to slight oscillatory deviations in the blood-sugar curve, but this is within limits of experimental error.

This experiment was repeated on 25 healthy individuals and the results obtained confirmed the previous experiment. This test was subsequently tried on cases of definite hepatic diseases, clinically diagnosed as cirrhosis of the liver, salvarsan-jaundice, acute yellow atrophy, etc., and in every one of these cases the test revealed an impairment of the functional capacity of the liver by showing a definite rise in the sugar content of the blood. This test was also tried on a few cases of infantile cirrhosis of the liver and a very high



degree of liver damage was revealed in two cases which ultimately proved fatal (Chart I, B)

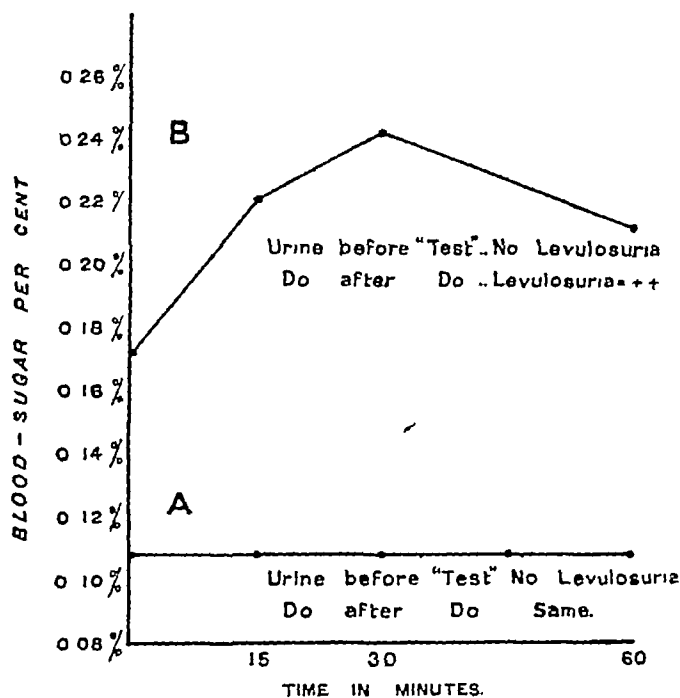
The explanation of why a dose of lævulose will cause no rise in the blood-sugar content, whereas a similar dose of glucose will cause a rise, may lie in the supposition that in the case of lævulose, the sugar after absorption from the alimentary tract is very readily taken up by the liver and stored as glycogen so that none of it can get into the systematic circulation. If the functional activity of the liver be diminished in any way, e.g., by degeneration of the hepatic parenchyma which is so often seen in such cases as salvarsan-jaundice, it will not be able to deal with the 25

CHART I.

*Lævulose tolerance curves.*

(A) Normal curve.

(B) Curve of impaired liver function



or 50 grammes of lævulose presented to it, part of it being still converted into glycogen, (depending on the extent of damage of the liver parenchyma), and part escaping to the general circulation, causing thereby a rise in the blood-sugar concentration. Thus by doing a lævulose tolerance test, i.e., giving the patient a certain dose of lævulose by the mouth and examining the blood for sugar before, and at intervals of 15 minutes for one hour or an hour and a half after the test meal, and plotting the results on graph paper, (5) one can easily get results which will demonstrate the condition of the liver, normal or otherwise. In a perfectly healthy individual, as stated before, there should practically be no rise, and the blood-sugar curve should be a straight line.

Glucose on the other hand is not stored as glycogen in the liver as rapidly as lævulose,

and the same holds with some of the other sugars, such as galactose, etc. Even in healthy individuals, part of these pass through the liver into the general circulation without change, thus causing a rise in the blood-sugar concentration which persists for about half an hour or so. Their subsequent disappearance from the blood stream is probably due to a carbohydrate-storage-utilization-mechanism which seems to act effectively about 15 to 30 minutes after the ingestion of the sugar (7).

*Action of carbon tetrachloride on the liver*— Since the introduction of carbon tetrachloride in the treatment of hookworm disease by Maurice C. Hall, (8) much has been written about the toxicity of the drug.

Lake (9) reports that a monkey receiving a total quantity of 60 c.c. during a period of 30 days showed no changes in any organ on post-mortem ascribable to carbon tetrachloride. This monkey received 40 times the indicated dose per kilogramme as compared with man and this dose was repeated 12 times within a period of 30 days.

Smillie and Pessoa (10) came to the conclusion that carbon tetrachloride in large doses has a toxic action upon the host, similar to that of chloroform. A serious manifestation is fatty degeneration of the liver, which first manifests itself two to three days after the treatment. This condition, however, is rare and is seldom fatal.

Leach, (11) however, gave as much as 10 c.c. to a condemned criminal followed a week later by 2 c.c., without producing serious symptoms. On post-mortem examination 20 days later, he observed no macroscopic lesions of the liver. Another criminal, given 10 c.c., showed on post-mortem marked congestion of the liver.

Nicholls and Hampton (12) gave 12 c.c. to a criminal who was executed 4 days later and no liver necrosis was found.

Docherty and Burgess (13) reported granular degeneration of the liver cells and leucocytic infiltration in one case after a single dose of 5 c.c. and fatty degeneration of liver cells and diffuse leucocytic infiltration in another, after 5 c.c., followed two weeks later by 3 c.c. Docherty, however, makes no mention of the purity of the drug which he used.

Meyer and Pessoa (14) gave carbon tetrachloride to 25 dogs, the doses varying from 0.05 to 3 c.c. per kilogram of body weight and noticed on post-mortem marked fatty degeneration of the liver in no less than 15.

Hampton (15) administered to a condemned criminal 6 c.c., repeated the same dose two weeks later, and four days after the last dose no change in the liver could be detected on post-mortem.

Lambert, (16) in his observations on 50,000 persons treated with carbon tetrachloride, records 3 deaths. It is remarkable that two of these were children, one aged 5, another aged 7. Necropsy revealed petechial subcapsular hæmorrhages in the liver, and very severe necrosis of the central and intermediate zones of the lobules. It is also a remarkable fact that all these three were heavily infected with ascarids also.

Chopra and McVail (17) state that frequently repeated doses of 0.5 to 1.6 grammes per kilo of body weight appear to have a toxic effect on the liver cells of dogs. They have given even 32 grammes per kilo, however, without causing any permanent damage to the liver.

Lamson and McLean (18) studied the toxic effect of carbon tetrachloride in dogs by means of the phenol-tetrachlor-phthalein liver function test. They found that administration of 2 cc per kilo produced no

On the other hand Caus and Mhaskar (20) state that a maximum dose of 5 cc is non-toxic to man.

Such are the conflicting statements as regards the action of carbon tetrachloride on the liver. To determine whether any functional disturbance of the liver is caused by therapeutic doses of carbon tetrachloride, one of us (J. P. B.) performed lævulose tolerance tests on some uncomplicated cases of ankylostomiasis, treated at the Carmichael Hospital for Tropical Diseases, Calcutta, under the direction of Dr. J. Borland McVail. The cases were selected at random and were treated on the lines advocated by McVail, i.e., pure carbon tetrachloride minimis 70 with a purge (preferably an ounce of saturated solution of mag. sulph.) constituting a single adult dose and repeated the next day. The course is repeated, if necessary, after seven days. The results of 8 cases are tabulated below—

It will be seen from the above table that

TABLE I

Case No	No of hookworm ova on one slide before treatment (Clayton Lane's method)	Hb %.	LÆVULOSE TOLERANCE TEST		Interval between last dose of $\text{CCl}_4$ and lævulose tolerance test
			Before treatment	After treatment	
183	1,549	20 %	Normal	Normal (after 2 courses of $\text{CCl}_4$ )	4 days
206	9	70 %	Normal	Normal (after 1 course)	18 days
209	33	30 %	Normal	Normal (after 2 courses)	1 day
233	298	35 %	Slight impairment	Slight impairment (after 1 course)	12 days
241	12	30 %	Normal	Normal (after 1 course)	3 days
245	476	30 %	Normal	Normal (after 1 course)	8 days
258	359	35 %	Slight deficiency	Slight deficiency (after 1 course)	13 days
				Almost normal (after 2 courses)	6 days
264	23	55 %	Normal	Normal (after 1 course)	5 days
270	170	53 %	Normal	Normal (after 2 courses)	10 days

demonstrable disturbance in the liver, whereas single doses of 4 cc per kilo produced functional disturbance, with complete return of function to normal within 96 hours. They also found that 4 cc per kilo, given in divided doses of 2 cc at a 48-hour interval, have no toxic effect.

Docherty and Nicholls (19) have recently reported three autopsies on condemned criminals following carbon tetrachloride treatment. They all received 4 cc, followed in 2 hours by 2 ozs of a saturated solution of Epsom salts. None of the patients made any complaint. They were executed three days after treatment and in two of them fatty degeneration of the liver was found.

pure carbon tetrachloride (free from carbon disulphide and phosgene), given in therapeutic doses as indicated above, has no damaging effect on the liver whatsoever. Further it is interesting to note that the two cases in the above table which showed a slight deficiency in the functions of the liver before the treatment showed no further deficiency after a full course of carbon tetrachloride.

## REFERENCES

1. Rosenthal, S. M. *Jour Amer Med Assoc*, 1922, Vol LXXIX, p 2151.
2. Fillipi, *Zeit f Biol*, 1907, Vol XLIX, p 511, 1908, Vol LII, p 38.
3. Jacobson, *Amer Jour Physiol*, 1920, Vol LII, p 233.

resistant, as, in spite of frequent quinine injections the fever recurs off and on. These are cases well worth a trial. After a few intravenous injections of quinine bihydrobromate, 5 grains on alternate days, the cacodylate was given twice weekly. The response was immediate, the appetite improved, and the patients began to feel that their chronic illness was disappearing. About two months of this course with gradually increasing intervals between injections is all that is required to effect a cure in most cases. My experience is mostly of patients coming from Bombay, Calcutta and its neighbourhood. The quinine-resistant type so frequently met with in these areas is the one where I would suggest a trial of this drug in large doses.

The fourth class of cases to get this high dose of cacodylate were certain dry skin affections. Most of these cases responded very well, the period of treatment being much curtailed as compared with results under the old small doses system.

The fifth class of cases were those of chronic bronchitis and phthisis, cases running a chronic course. These were very favourably influenced by the injections. It requires a longer trial, however, than I have been able to give to pronounce a definite opinion as to its ultimate value. The drug should not be forgotten, however, in our armamentarium against these diseases.

My object in writing this note is to lay special emphasis on the fact that the timidity

shown in use of sodium cacodylate as regards dosage is quite groundless. To be really effective it should be given and has been given in fairly large doses, from 10 to 30 grains bi-weekly, intravenously in 5 c.c. of distilled water without ill effects or any toxic symptoms developing, though one should always be on watch for these. Perhaps larger doses may be tolerated, but I have gone so far and have not yet given larger doses.

### ON THE POTENCY OF INSULIN IN THE TROPICS \*

By JOYTI PROKASH BOSE, M.B. (Cal),

Dr. Mitra Research Scholar in Diabetes, Calcutta School of Tropical Medicine

SINCE the publication of the results of my experiments on insulin of American make (Lilly & Co., Indianapolis) in the *Indian Medical Gazette*, December 1923, I have tested the potency of other brands of insulin which have since made their appearance in the Indian markets. The lines indicated by the Medical Research Council of England for the pharmacological assay of insulin have been strictly followed, and rabbits of prescribed weights (fasting for not less than 24 hours) have been used for the tests. Two or sometimes three rabbits were used for each experiment in order to do away with any error resulting from the natural variations in rabbits.

The results obtained are given in the following table —

TABLE

Date of test	Brand of insulin tested	Weight of rabbits in grams	Hours of fasting before test	No. of units injected	Blood-sugar before injection	Blood-sugar 1 hour after	Blood-sugar 3 hours after	Percentage of maximum reduction of blood-sugar	REMARKS
21-11-23	A B batch 243, Oct 1923. Fresh lot brought by Mr. Grimeshaw	1910	36	6	0.128%	0.106%	0.078%	39.1%	No convulsions
21-11-23	Do	1876	36	15	0.104%	0.09%	0.06%	42.4%	do
7-1-24	Do (sent out in cold storage)	1750	24	15	0.115%	0.078%	0.059%	48.8%	do
24-1-24	A B batch 258, Dec 1923	1880	24	6	0.120%	0.086%	0.06%	50%	do
24-1-24	Do	1790	24	15	0.125%	0.08%	0.052%	58.8%	do
18-12-23	Wellcome brand insulin	1800	24	6	0.122%	0.100%	0.072%	40.2%	do
18-12-23	Do	1890	24	15	0.112%	0.085%	0.056%	45.5%	do
24-1-24	Do (Fresh batch sent by Burroughs Wellcome and Co., Bombay)	1700	24	15	0.116%	0.08%	0.058%	50.0%	do

\* Further notes with regard to insulin in the tropics and letters from the British Drug Houses, Ltd., and from Messrs. Burroughs, Wellcome & Co., referring to the particular brands of insulin mentioned in this article

as well as further letters on the same subject from correspondents, will be found in the Correspondence columns of this issue on pages 165 and 166—EDITOR, I M G

The conclusions one may draw from the above results are as follows —

(1) That A B brand insulin batch 243 is at least one-fourth of the prescribed original potency

(2) That the same brand of insulin sent out in cold storage does not show any difference in results with regard to potency

(3) That A B insulin, batch 258, is comparatively a more potent insulin than batch 243. The makers claim that their newest product is some 50 per cent more active than was the former product

(4) That 'Wellcome' insulin yielded more or less the same sort of results as regards potency as did the other brand

### ON THE FAILURE OF *VITEX PEDUNCULARIS* IN THE TREATMENT OF MALARIA

B. R. N. CHOPRA, M.A. M.D. (Cantab.),

MAJOR, I.M.S.

R. KNOWLES, B.A. (Cantab.), M.R.C.S. L.R.C.P.

MAJOR, I.M.S.

and

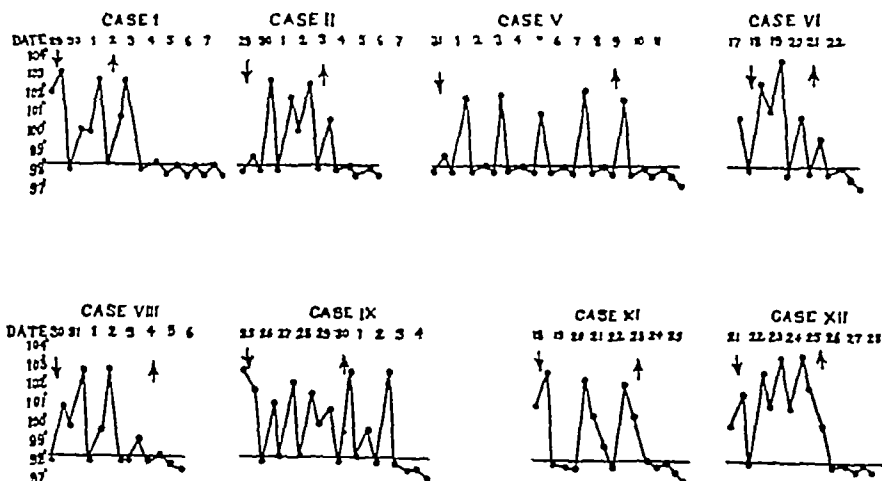
Asst Surgeon I. C. GUPTA, M.D. (Cal.)

From the Calcutta School of Tropical Medicine

In an article published in the *British Medical Journal* of the 5th February, 1921 Lieutenant-Colonel I. C. S. Vaughan I.M.S. pointed out that

regarding its medicinal properties by the old writers is its use for external application for pains in the chest. Vaughan, however, found that the aboriginal tribes of certain parts of Bihar were well acquainted with this plant, and used it in the treatment of malarial fevers and also of blackwater fever which sometimes occurs among them. They prepare an infusion of the leaves or of the root-bark or young stem and take it internally several times a day with much benefit. Preference is given to the dark coloured root plant over the pale coloured variety.

Vaughan tried this drug in a series of cases in both these diseases and reported that it gave very satisfactory results. He originally used the method of making an infusion employed by these tribes. This consisted in taking two ounces of fresh leaf or of leaves dried in the shade and dropping them into 40 ounces of water, boiling for 5 to 10 minutes, and then leaving them to infuse for another hour. The resulting infusion was about the colour of strong cold tea in appearance and in taste, and was given sweetened with a little sugar in doses of 8 to 10 ounces in 24 hours. Concentrated infusions prepared on the lines of infusion gentiane compositum (concentrated) of the British Pharmacopœia were also tried by him, but the therapeutic effects were not so marked. He adopted the method of using 1, 2 and 4 ounces of leaves in 40 ounces of water to suit different cases and the results



Arrows pointing downwards show when *Vitex* was started and those pointing upwards where Quinine or Cinchona was started and *Vitex* was stopped

the plant *Vitex peduncularis* was useful in the treatment of blackwater fever and of malarial fevers. This plant grows in Bihar, Eastern Bengal and the Central Provinces, though it is not very well known. In Hindi it is known by various names,—*Nagbail*, *Nagpheni*, *Charaigorwa*, *Chhagraruba*, *Minjur-gorwa*, in Bengali it is called *Boruna* and *Goda*. The only reference

obtained by this treatment were said to be very striking.

In the latter part of 1922, the Government of Bihar sent specimens of leaves of this plant to one of us for investigation with regard to its chemical composition, pharmacological action and clinical trials. Dr. Sudhamoy Ghosh, Professor of Chemistry to the School,

analysed the drug, and found traces of an alkaloid present. The drug was tried in a number of cases of malarial fever at the Carmichael Hospital for Tropical Diseases, closely following the instructions given by the author in the paper referred to above with regard to preparation of the infusion and its mode of administration. As our results were not satisfactory we communicated with Colonel Vaughan who said that this was probably due to the leaves not being collected at

parasites. No other drugs were administered whilst the infusion was being tried, with the exception of ordinary purgatives. A glance at the table and at the temperature charts given will show that none of our cases were benefited at all. The parasites in the blood remained quite unaffected and so did the clinical symptoms. In one or two cases the fever abated somewhat, as often happens without any treatment, but in these cases parasites were still found in the blood films.

TABLE

*The use of Infusion of Vitea peduncularis in cases of Malaria Fever*

Serial No	Name	Sex	Age	Residence	Blood findings before administration	Date of commencing Vitea administration	Blood findings whilst on Vitea treatment	Date of starting specific treatment	Blood findings whilst on specific treatment
1	Kalpada Pradhan	M	25	Howrah	B T and M T rings +++	29-11-23	30 11-23 ++ 1-12 23 ++	Mist Quinine Sulph gr ad oz 1 2-12-23	3 12-23 } 4 12-23 } 7-12-23 } Negative
2	Shib Ch Roy	M	39	Howrah	M T rings ++	29-11 23	30-11-23 ++ 1-12 23 ++	Mist Quin Sulph 3-12-23	4 12 23 } 6 12-23 } 7-12-23 } Negative
3	Narendra N Neogi	M	40	24-Parganas	Quartan ++	4 12-23	4-12-23 to } ++ 12-12 23 }	Mist Cinchona 13-12 23	14 12-23 } 16 12-23 } 17 12-23 } Negative
4	Bijoy K Ghoshal	M	30	24-Parganas	M T rings +	17-12 23	19-12-23 } + 20-12-23 }	Mist Quin Sulph 21-12-23	22-12-23 } 23-12-23 } Negative
5	Amulha Das	M	23	Entally	M T rings and crescents +	31 12 23	2-1-24 to } ++ 9-1-24 }	Mist Quin Sulph 9-1-24	10-1-24 } 11-1-24 } Negative
6	Madhu Mutt	M	26	Madras	M T rings ++	18-12 23	18 12 23 to } ++ 20 12 23 }	Mist Cinchona 20-12-23	20-12-23 } to } 8 1-24 } Negative
7	N Mullick	M	52	Calcutta	Quartan ++	16-1 24	18-1 24 } ++ 19-1 24 }	Mist Quin Sulph 20 1-24	21 1-24 } to } 1-2-24 } Negative
8	Abdul Rahim	M	30	Calcutta	B T rings ++	30 10-22	30 10-22 to } ++ 3 11 22 }	Mist Quin Sulph 4-11-22	6-11-22 } to } 8-11-22 } Negative
9	Buphati	M	12	Howrah	B T rings +++	25-4 22	25 4 22 to } ++ 29 4 22 }	Mist Quin Sulph 30-4-22	30 4 22 } to } 5 5-22 } Negative
10	Bullar Adak	M	26	Hooghly	Quartan +++	15-4-22	15-4-22 to } ++ 19-4-22 }	Mist Quin Sulph 24-4 22	25-4-22 } 26-4-22 } Negative
11	H N Gupta	M	30	Calcutta	B T rings +++	18-10-22	18 10-22 to } ++ 23 10-22 }	Mist Cinchona 23 10 22	24 10 22 } 26 10 22 } Negative
12	Kantuk	M	22	Calcutta	M T rings +++	21-10-22	23-10-22 } ++ 25-10-22 }	Mist Quin Sulph 25 10 22	27 10 22 } 28 10-22 } Negative

the right time of the year. He very kindly promised to supply us with proper specimens, and these arrived a few months later. An infusion made from these was tried in a series of cases and the details are given in the above table. It must be pointed out here that all the cases which were put on to the infusion were first examined for malarial parasites and only such cases as were positive were given the infusion. Daily blood films were taken and a careful search was made for

In cases Nos 2 and 4 the infusion had to be replaced by quinine mixture after two days' trial, as the patient started to show signs of irritation of the central nervous system. A few doses of the latter drug immediately got the symptoms under control.

Neither the asexual nor the sexual forms of *P. vivax*, *P. malariae* or *L. malariae*, were affected in the slightest degree. In all these cases quinine or cinchona febrifuge in the usual doses produced a rapid disappearance of parasites from the blood.

and the fever and other symptoms rapidly subsided

#### Conclusions —

(1) Chemical analysis of the dried leaves of *Pteris peduncularis* shows the presence of traces of an alkaloid

(2) In our series of cases of malarial fever, however, caused by *P vivax*, *P malariae* and *L malariae*, the freshly prepared infusion of dried leaves had no effect whatever on the parasites in the blood, on the temperature chart or on the other clinical symptoms

(3) The drug appears to be absolutely useless in the treatment of malaria

#### REFERENCES

- (1) Kirtikar and Basu. *Indian Medicinal Plants*
- (2) Vaughan "A Preliminary note on the use of *Pteris peduncularis* in Malaria Fever and Blackwater Fever" *Brit Med Journal*, Feb 5, 1921
- (3) Watt's Dictionary of Economic products of India, Vol VI

### SOME COMMON AILMENTS OF CHILDREN, THEIR IDENTIFICATION AND TREATMENT \*

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MAJOR, I.M.S.,

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A POST-GRADUATE CLINICAL LECTURE  
GENTLEMEN,

ONE of the commonest complaints with which a mother faces her doctor is that her baby does not gain in weight, and I warn you that if your treatment is not a success she will quickly seek advice elsewhere. This condition I shall call, for want of a better name, *failure to gain*. These two babies which I show you to-day, both under the age of 12 months, are admirable examples of this condition. One mother will tell you that she has been feeding her baby on a much vaunted baby food, the other that she has been feeding hers on a mixed diet. The one infant has thrush and multiple boils, and the other has a septic discharge from the ear. Both are obviously anæmic, pot-bellied and wasted. Now if you will listen to the answers to my questions you will hear that there is marked constipation, the stools are brittle, grey, soapy, and somewhat offensive. There is slight fever at times, and restlessness at night, the appetite is poor and the weight has been at a standstill for the last three months.

*Failure to gain* is exceedingly common but the recognition of its cause is rarely diagnosed in time to prevent such complications as these infants show, with the result that symptoms alone are treated, whereas the fundamental error remains and much time and expense is wasted. Therefore, I would

advise you most earnestly to bear in mind that your success with such infants in private practice will lie in direct proportion to your remembering the facts that, roughly speaking, human milk contains protein 2 per cent, fat 3 per cent, carbohydrates 7 per cent, whereas cow's milk contains protein 4 per cent, fat 4 per cent, carbohydrates 4 per cent. Without such figures constantly in your mind it is impossible to work out where the fault in feeding has been, or how to prescribe the correct diet.

In 75 per cent of cases the fault is in the feeding, and in 25 per cent the fault is in the infant.

What are the common faults in feeding? They are (1) insufficient feeding, (2) too much feeding, (3) too much sugar, (4) excess of starch-containing food, (5) irregularity, and (6) the bulk of each meal is greater than the age of the infant should permit.

I need not remind you how many types of these cases there are. One day you will see a baby a few months old on pure cow's milk, another day one who has been obtaining in addition to an already liberal diet, a teaspoonful of olive oil, or two of cream, or four of heavy top milk in its feeds. Again one having a teaspoonful of sweetened condensed milk, which is equivalent (if you will measure the spoon) to 150 drops in 3 ozs of water. The next day an infant fed according to the directions on the tin or bottle of some much vaunted dried milk food, which, if you care to work it out, you will find is equivalent to 12 per cent carbohydrates. Another day you will see a seedy infant under 6 months of age on Bengers, Allenbury's No 3, or Savory & Moore's. Another day one who has been fed at any hour or time that suits the mother. Another day you will find a child of four months old having 6 or 7 ozs feeds, and you will hear that it thrived for a time and then steadily started going down hill.

I remind you of these things because a fog surrounds the subject of infant feeding and its primary principles which should be based on the formula of P2, F3, CH 7, and, if you doubt my assertion that it is the digestion that is the primary cause of the complications that these two infants show, let me prove it to you by showing you a test that you may yourselves carry out in every case. Ask the mother to collect ordinarily, or if need be in a clean white mackintosh, some of the urine of the infant who *fails to gain*. In nearly every case—and certainly in these two, you will find that if you will take a sample in a test tube and will add a few drops of 5 per cent sodium nitro-prusside shake, and add one drop of acetic acid and then down the slanting tube add drop by drop liq ammon fort, you will get at the junction a rust-

\* Being a Post-Graduate Clinical Lecture.

brown or purple ring,—the so-called acetone reaction, and if you like further to test the urine you can easily demonstrate indican as well. Moreover, if other proof is needed, you will find on analysing the stools that there are excessive alkaline bases and soaps therein. Whatever the error may be, the result is the same, *failure to gain*, this being due to an ill-balanced diet with lack of assimilation of fat, protein, or carbohydrates.

I have said that 25 per cent of the causes are in the infant itself these causes are either (1) some recent illness, such as acute enteritis, whooping cough, or measles (2) Constipation (3) Some glandular defect in the intestines, pancreas, or endocrines (4) Syphilis (5) Some rarer cause, such as pyelitis, tubercle, congenital heart disease, or anaphylaxis

Now remember, that whatever the cause may be, the mother expects you as a doctor to find it out and to correct it. Therefore before going into the details of treatment I would ask you to remember a few useful points, e.g., that —

(a) One measured teaspoonful of separator cream in 3 ozs milk mixture is equivalent to 5 per cent fat

(b) One measured teaspoonful of top milk in 3 ozs of milk mixture is equivalent to 3 per cent fat

(c) A lump of butter, the size of a green pea, in 3 ozs of milk mixture is equivalent to 3 per cent fat

(d) A lump of sugar or one level teaspoonful of Mellin's Food in 3 ozs of milk mixture is equivalent to 5 per cent carbohydrate

(e) The milk of a cow, or goat, or if possible, of a herd of cows, is immeasurably better than any patent food, because you can then accurately feed the baby

(f) If you must order a dried milk food, always order one teaspoonful less than the directions given on the tin or bottle

(g) If a baby is not satisfied with the quantity of food in its bottle, increase the quality, for the stomach of a child under 6 months will not hold a greater quantity than 1 oz over its age in months, e.g. if the baby is 4 months old, 5 ozs should be its feed. Give lots of boiled water between feeds

(h) Enquire and work out the amount of protein, fat, and carbohydrates that the baby has had up to date per feed

(i) For the first three days allow no sugar whatever, you will find that mothers will resist this and say that their babies will not take their food if it is not sweet, therefore, for the first three days, until the infant is on Mellin's, add  $\frac{1}{8}$  or  $\frac{1}{4}$  gr saccharine in order to make the food palatable

(j) Remember that patent milk foods unintelligently used are among the curses of modern civilization, and undoubtedly become a boomerang for evil from infancy to youth, and from youth to adolescence, for I need not remind you that that immense group of symptoms which are generically classified under the heading "spasmophilia," are to a very great extent due to gastro-intestinal disturbances which have had their origin in patent rather than natural food during babyhood

Still less perhaps is it necessary for me to prophesy that as a result of the Great War with its effect on infant dietetics, and the modern tendency of all classes of society to rely upon patent baby foods, that obstetric difficulties and anomalies will increase

Recently a so-called authority euphonomously referred to the milk supply of India as white sewage. Such a statement is ridiculous and tends to put back the clock. Everywhere in India, mofussil or big town, reliable milk of either cow or goat can be procured. Most earnestly I would ask you, if you consider your cow's milk not reliable, to induce your patient to keep one or more goats, these animals, procurable everywhere, if tended and fed properly, give a milk supply ten thousand times better than any patent food and at a cost infinitely cheaper

(k) Always put your directions in writing

*Treatment*—This to a very large extent is entirely dietetic, and my advice to you would be as follows —

First explain to the mother that it is most necessary to rest the digestion of the baby for 12 to 24 hours, by giving it nothing but barley water, or rice water. Then I would advise you to place the baby on skimmed milk, which is a fat-free, easily digested food, and is made by simmering milk in an open pudding basin for half an hour, remove, and put in a cool place for 2 hours, after which you will find the fat has risen as top milk. This is removed by means of a flat spoon to a depth of  $\frac{1}{4}$  or  $\frac{1}{2}$  an inch, the milk below is known as skimmed milk, and should be the sole diet for at least one week. The first day you will give a dilution of 1 in 3, the second day 1 in  $2\frac{1}{2}$ , the third day 1 in 2, the fourth day 1 in  $1\frac{1}{2}$ , and so on until the baby is on pure skimmed milk if it is over the age of 6 months. By similar progression you will gradually get the infant back on to ordinary cow's milk. The amount of skimmed milk given per day should be  $1\frac{1}{2}$  ozs per pound weight, that is, if the baby weighs 10 lbs it should have 15 ozs per day to start with. On the third or fourth day you should add to the diluted skimmed milk one teaspoonful of Mellin's Food, which I might remind you is dextrin-maltose and, therefore, an

easily digested carbohydrate, and better than sugar. The amount of Mellin's should be given progressively up to 2 teaspoonfuls per feed. On these lines you will find that the child in a very short time rapidly gains in weight, its tongue cleans and skin clears, then, and not till then, you may gradually increase the diet to a normal and healthy optimum. Medicines are rarely needed, a mixture of paraffin, one ounce, and milk of magnesia, one ounce, of which 2 teaspoonfuls are to be given twice a day if necessary, is most useful. Fruit juices should be given as usual,—not less than 1 ounce per day.

I do not think that in *initial* stages grey powder benefits these cases unless the cause is syphilis.

Remember that many of these cases are complicated by obvious signs of rickets and therefore you may be inclined prematurely to order cod-liver oil, eggs, or cream, let me warn you that if you do so before you have corrected the fundamental fault which is that of *digestion*, you will only make matters much worse, for these infants in the majority of cases, have been wrongly or overfed and therefore cannot digest their diet or improve in health if given excess of fat.

My own experience of these cases is very great, and I know that if you will treat your cases at first for 2 or 3 weeks, as I have suggested you will find that they will quickly cease to cause you or their mothers anxiety.

In large cities insurmountable difficulties are often raised to the subject of using natural skimmed milk if so I recommend the temporary use of Horlick's Malted Milk or a very diluted Ideal Milk or one of the proprietary patent skimmed milk foods. These are all approximately fat-free and should therefore, be used for a period of at least three weeks, but no longer, for long before that period has elapsed you will have been able to procure a goat.

*Acute Dyspepsia* or *Acute Gastro-Intestinal Catarrh* are names for a condition extremely common and I need not remind you that this condition is to all intents and purposes only an acute form of failure to gain. Its causes are in the main the same, i.e., excess of sugar, excess of fat, or excess of protein. Look at this infant, typical of scores you will see every week in your practice or in your out-patient departments. It is flabby, pale, and big bellied, with a dry furred tongue, slight fever and sore buttocks. The mother will tell you that recently the appetite has been poor, the nights restless and fretful with teeth grinding, there has been vomiting, and the stools you will see are green, acid, sour and frothy. I will test the urine and you will see that there are marked acetone and indican reactions. The mother will tell you

that he has been wasting despite change of diet from one patent food to another, and so-called tonics ordered by the doctor. You will see from the attached slip from the doctor that he suspects tuberculosis because there is slight retraction of the head, due, no doubt, to reflex irritation from its middle ear.

This condition of acute dyspepsia, or, as I prefer to call it, acute gastro-intestinal catarrh is very common, but what I want to impress on you is that this condition is, so to speak, a cloud-burst occurring in all children who have been wrongly fed without judgment, or consideration as to the normal capacity of the child's assimilative powers. The symptoms are really those of mutiny after long misuse, and if you do not spot this by your urgent and concise enquiry you are apt to think you are dealing with a case of acute dysentery, and so, though you may perhaps slowly drag the child through the attack, you may fail to obviate a recurrence of the symptoms in a few weeks' time. I can assure you it is not acute dysentery in the accepted sense of the term, but merely a form of fermentative diarrhoea which will get well in a few days if correctly diagnosed and treated. Here perhaps you will let me digress for a moment to remind you that amoebic dysentery is very rare in young children. In my own experience it certainly does not occur in more than 5 per cent, however, I would ask you to bear with me when I say never give emetine until amoebae have been demonstrated by a reliable observer, and if in doubt *never* give it, for often I have seen lives endangered and lost on the false assumption of amoebic dysentery. Bacillary dysentery, on the other hand, is far more common, its principles of treatment, as you know, are those of bacillary dysentery in adults.

How will you treat this case of acute gastro-intestinal catarrh?

In the first place, let me advise you to starve the baby for the first few hours and to give only plain water, weak tea, or rice water, with or without saccharine  $\frac{1}{2}$  gr to a pint for the first 12 hours. In the second place let me warn you against permitting any sugar for at least three days. Thirdly, I would ask you to remember that you are dealing with a condition of acute acidosis, and, therefore, you must supply an alkaline fluid.

I think the very best method is to give directions that the child shall drink 1 to 2 pints per day between feeds of a solution made by adding half a teaspoonful of common salt to a pint of water. This acts in two ways—(1) It rehabilitates the normal plasma of the blood, for it is very quickly absorbed.

(2) It makes the child automatically thirsty and therefore one succeeds in getting it to take more fluid by mouth. After 12 to 24



hours on the above innocuous fluids the child should be given skimmed milk according to the method indicated in *failure to gain*. On the third day dextrin-maltose in the shape of Mellin's can be added as before. As progress shows itself, the diet may be very gradually increased in the shape of rusk biscuits, dry toast, Grape Nuts, vegetable soup, etc. In the majority of cases no medicines are needed, but constipation is likely to occur and for this again paraffin and milk of magnesia mixed are the best laxatives and anti-fermentatives.

If the onset of the complaint has been so fulminant that you suspect bacillary dysentery, or at least are not sure, then I would advise you to put the child on a prescription, as follows, every hour until the stools become brown and alkaline. The prescription is —

Sodium Bicarb	10 grains
Sodium Citrate	10 grains
Sodium Sulphate	15 grains
Glycerine	20 minims
Aqua Anisi	1 drachm

The preliminary saline and rice water treatment being adopted as above, brandy, 5 to 10 drops, may, if you wish, be added to each feed.

On such lines of treatment you will find that the child, after a primary loss of weight, will rapidly pick up, it then becomes your most urgent duty to guard the diet against any recurrence of such symptoms or attacks, remembering that excess of fat, or food, is the commonest cause.

*Chronic Gastro-Intestinal Catarrh* is the commonest children's complaint in India. You will see it in rich and poor alike, but most frequently of all you will see it in the children at boarding schools, indeed so common is it that I could almost tell you when such schools are closed for vacations, for it is then that these cases are brought in large numbers to out-patient departments or consulting rooms.

The cause of this trouble is entirely dietetic. As a rule the diet includes too much sugar, or starch, or rich food. At times there is a history of bad cooking, or indigestible food and hurried feeding. My own experience leads me to think that if there is one article of food, more than any other, responsible for this condition in European children, it is the plantain.

Look at these two children, one from a Calcutta day school, the other from a hill school. One had whooping cough in July, the other is obviously rickety. One is 7 years old and the other is 4. Listen to the story of porridge, curry rice, and plantains, day after day, and then observe well the symptoms and signs which make the diagnosis certain. The mothers will tell you that they

are easily tired, have fainting attacks (so-called), and grind their teeth, in one the appetite is poor and in the other voracious, there is occasional fever with every now and then a so-called bilious attack accompanied by vomiting and abdominal pain. One child wets his bed at night, in both the stools are slimy and very offensive, the tongue of one is flabby and furred, while in the other it is typically mapped, their teeth are bad, and there are dark lines under their eyes, they have big protruding bellies, and the mothers state they have often a "stomach cough". The younger of them has a typical lichen rash, and, if you will watch me test these two specimens of urine, you will see that both give marked acetone and indican reactions.

These two children are typical of hundreds all over India of all creeds and stations, they cause great anxiety to their mothers, and many of these cases have been diagnosed as tuberculosis, or even appendicitis, and yet I can tell you that there is nothing more remarkable than to watch their improvement if a correct diagnosis is made, and I might even say there is nothing more convincing in practice than to demonstrate the urinary fault, but let me warn you at once that improvement will not be obtained by giving cod-liver oil, or Parrish's Chemical Food, or other emulsions, indeed I find that the majority of cases have had these so-called remedies, and most of them have had treatment for worms, but have not improved.

If you will recognise the condition, a cure is certain, if you do not, chronic ill health, and possibly the supervention of some more serious disease may carry the child off. It is this disease in India which, remaining undiagnosed, follows measles and whooping cough and lays the trail for tuberculosis. How many times have you not heard a mother say that her child's health was splendid until he had measles or whooping cough, but the child has never picked up since?

I feel that if only practitioners would make it a habit to test the urine for acetone and indican, much child suffering would be saved, and here I would like to say that if a child has contracted measles or whooping cough in the hills and fails rapidly to recuperate, it would be far better to send him to a seaside resort, for undoubtedly the hills do not suit these cases when their gastro-intestinal tract is out of order.

Your rules for treatment should be as follows —

- 1 Attend to the teeth and moderately starve for three days first.
- 2 Make the child chew and not bolt its food.
- 3 Exclude the presence of worms, also of enlarged tonsils and of adenoids.

4 Water ad lib but no food or sweets between meals

5 Nothing to eat after 6-30 p.m. except a cup of milk and a rusk

6 If under 4 years of age, wake from sleep half an hour before meals and allow to run about

7 Postpone drinking till after meals, or one hour before meals

8 Do not give too much milk in addition to a substantial dietary

9 Do not give cod-liver oil But you can give malt alone one to two drachms, after meals, or malt and pepsin

10 Do not give iron, or any iron tonic such as Parrish's food, etc., until the child has been on a "stomach alkaline mixture," etc. for two to three weeks, with a powder such as—Hyd cum Cret gr 1, Pulv Rhei grs 2, Sod Bicarb grs 3, Sacch Lac grs 4 each night, and until the tongue is clean

11 Prevent constipation But never give raw fruit for constipation

12 Hard mattress Light bed clothes and lots of sun and air

#### Diet

May not be taken

Ordinary bread, buttered toast, biscuits, brown bread, whole-meal bread, farinaceous puddings, (sago, rice, tapioca, arrowroot, etc.), porridge, pastry, sweets, chocolates, cheese, potato, much butter any jam, thick soups, fried or salted, or fatty meats, vegetables (except as opposite), raw fruit, fruit cake, plain milk, tea and coffee, bananas (plantains), scones, smoked fish

May be taken

Bread baked hard, dry hard toast, rusks, Veda bread, Grape Nuts, lemon sponge, Force, malted infant foods, e.g., Horlick's, calf's foot jelly Madeira cake, a little butter, little honey or treacle, clear soup, beef tea, chicken tea, underdone meat, fish, chicken, sweetbread, mutton, eggs boiled, bruns, minced bacon fat, spinach, flower of cauliflower, Brussels' sprouts (mashed), vegetable marrow, very little mashed potato, fruit juice, diluted milk, whey, malted milk, skimmed milk, Bulgarian milk, cocoatina Ovaltine

Constipation is frequently a source of trouble, for this senna pods, or paraffin and milk of magnesia, or "Cascara Evacuant" are useful These children are often anæmic, and I warn you that no iron or tonic emulsion should be given for the first 2 or 3 weeks, and not until the tongue is perfectly clean, after this period any mild iron preparation is useful As the health improves, the diet can gradually become more liberal, but if there is a return of any of the symptoms, the forbidden article of food should be stopped at once As a rule it takes from 4 to 6 weeks before the child regains health

This disease is often called *mucous disease*, and often you will find that mothers bring their children with the sole complaint that they are passing mucus in the stools, but no

worms have been passed or seen after or before worm treatment, therefore if you do not thoroughly examine the child—and by this I include a proper urinary examination—you may miss the diagnosis and treat the case for weeks as dysentery, or chronic colitis

*Acute gastro-enteritis*—This infantile disease is perhaps the greatest nightmare of all to mothers in India The onset of the hot weather is the commonest time, and very frequently it is due to the non-recognised fact that in the hot weather the child does not want so many calories of food as it does in the cold, for instance, a child may be having a perfectly correct food in March or April, which is too much for him in May or June, the result is that the digestion is very severely taxed, and vomiting and diarrhoea occur Now if this condition occurs in a child of 4 or 5 years it is labelled as a bilious attack, and frequently the child rapidly reacts to treatment or home remedies, for, as I have already told you a bilious attack is after all only an acute acidosis occurring in children with chronic dyspepsia, but if this diarrhoea and vomiting occur in an infant, the danger is very quickly appreciated by the mother, for, whether you call the disease summer diarrhoea or gastro-enteritis it makes no difference the prognosis is serious and treatment very imperative, as not only is acidosis present but there is also the factor of immense *dehydration* to be dealt with

What I want you most to bear in mind, is, that in these cases there is no specific micro-organism which you can isolate as the cause In some cases it is a putrefactive bacillus, and if you will bear this in mind, you can very often obtain confirmative evidence by looking at the buttocks and testing the stools In the putrefactive infection the buttocks are not sore or red, the stools are alkaline and offensive in the early stages, whereas in the gas-forming bacillus infection the buttocks are scalded and red and the stools are sour and acid

1 *Treatment*—Whatever the cause, whether injudicious feeding or infection, whatever the severity of the attack, the preliminary treatment is—

(1) to get rid of the poison and allow the inflamed intestine an opportunity of recovery,

(2) to counteract the acidosis,

(3) to supply the loss of fluid from bowel and stomach,

(4) as soon as possible give that fluid diet which will least provide a pabulum for the organisms which have caused the trouble, that is the putrefactive or fermentative type of bacillus

As regards No 1, put the child at once on half or one hourly doses of Sodium Sulphate grs 20, Sodium Bicarb grs 10, Sodium

Citrate grs 10, Glycerine 20 minims, Aqua Anisi 1 drachm, until the stools become watery and brown, if there is vomiting wash out the stomach with 1 per cent sodium bicarbonate solution, using a catheter and funnel, the same solution can be used to wash out the rectum. If the vomiting is severe 1/10 or 1/6 gr of calomel (B & W tabloid) every hour for 6 or 8 doses

2 *Acidosis* can be proved if you care to examine the urine, but more striking is the air hunger, the quick gasping respiration, the anxious expression, and the cherry-red lips in a white-grey face

The above prescription will assist you, but more useful is it to remember that this prescription will make the infant thirsty, and that if you will add half a teaspoonful of salt, and half a teaspoonful of soda bicarb to a pint of boiled water,—adding if need be half a grain of saccharine to make it palatable, the child will readily take this in large quantities, and by so doing supply the loss of fluid and become thirsty for more fluid

3 *Dehydration*—The shrunken muscles, loose skin, and sunken eyes, cry out that the tissues have been drained of fluid, this loss you must supply, or the infant will die. Undoubtedly the best way is to give the above saline by the mouth for the reasons I have given, and I can assure you that it is extraordinary to see the quantity of 1/2 per cent saline that these children will absorb. The bottle should be kept filled and beside the infant and it should be offered at all times. If you see the case late and it is obviously very urgent, then I would advise you to inject 4 ozs of saline, every 4 or 6 hours, into the axillæ or loins, using an ordinary serum syringe. This method is not painful and can be done very quickly, and the saline is very readily absorbed. In hospital or nursing home practice, personally in all cases of emergency, I prefer to use the intra-peritoneal method—by this I mean the method of injecting saline directly into the coelomic cavity. Choose a point in the middle line two inches below the umbilicus, and, using a large record needle attached to a funnel and tube, run in 12 to 18 ozs of hypertonic saline, with ordinary care there is practically no risk in this

What I want you to understand is that these children do not die directly from the effects of the poison they are manufacturing and absorbing from the bowel, but from the mechanical results of dehydration, therefore, if you can make good, and continue to make good the fluids lost, then you will only have the intestinal condition to deal with

4 *Feeding*—To begin with nothing is to be given except rice water, or weak tea. Rice water is less irritating than any other cereal, and is made by adding one tablespoonful of

rice to 1 1/2 pints of water, boil, strain, and add a pinch of salt. If the child is peevish, an excellent home remedy is to give raisin tea. This is a harmless glucoside and is made by adding one tablespoonful of raisins to one pint of boiling water, crushing and straining

After 24 hours you may give protein-milk, whey, or skimmed milk, alternately with the rice water

Remember you must increase the strength of the feeds very slowly. Under no conditions should sugar, or any fat-containing food, be given for several days, but if you consider the child is not having sufficient carbohydrates, you may give a small quantity of Mellin's, or some other malted food, such as Horlick's

5 *Treatment of symptoms*—*Abdominal pain* is best treated with hot compresses or Antiphlogistine

*Coldness or collapse*—Hot mustard bath, brandy per mouth, and saline per rectum or under the skin, or 5 per cent glucose solution per rectum, injections of camphor or pituitrin are sometimes of use

*Rectal Tenesmus*—Use hot fomentations applied to the anus, washing out the lower bowel with saline or an enema of starch

Remember never give any form of bismuth, chalk or opium, while there is fever

*Acute Œdema* sometimes arises as a result of the saline per mouth, or rectum, or under the skin, sodium citrate may cause the same thing. If the cause is recognised, all that is necessary is to stop these temporarily

*Vomiting*—For uncontrollable vomiting one minim doses of chlorodyne are useful. Remember that these children frequently suffer from lung complications and may die in convulsions

A remote complication of gastro-enteritis is chronic gastro-intestinal catarrh, which must be treated on the lines I have indicated previously

*Anæmia* is frequently a marked feature of these cases, and in the later stages must be treated by dietetic rather than by medicinal means, by this I mean that when the child is well, green vegetables milk and eggs, are undoubtedly the best foods, but it should be remembered that for many weeks these children are unable to digest food, and particularly fat well, therefore it is best to give skimmed, or malted milk until the stool reaction is good and the tongue is clean

Skin affections, such as boils which come out for weeks in crops are frequently seen. Correcting the diet, and a change of climate, are better than vaccines. Constipation is often troublesome, for this paraffin and milk of magnesia mixed or senna tea are useful

## A Mirror of Hospital Practice.

### A CASE OF ABDOMINAL INJURY TREATED BY RESECTION AND ENTERORRHAPHY

By S C DAS GUPTA, L.M.S.,

Senior Medical Officer, Bir Hospital, Katmandu, Nepal

On the 30th September 1923, at mid-day, Brannmacna, a Hindu male, aged 50, was admitted to hospital with an abdominal injury.

*History of present condition*—He was in a drunken condition when attacked by a wild buffalo, the horn of the animal penetrating deep into the abdomen through the upper part of the scrotum, beneath Poupart's ligament, and by the side of the inguinal canal. Immediately after the injury the man walked a few paces and ascended a bamboo ladder near by to save his life. Some neighbours rushed to his assistance, and finding blood on his clothes, brought him to hospital within half an hour of his sustaining the injury.

On removing the patient's dirty clothes, a coil of intestine was seen to be protruding from the wound, and examination shewed that the loop of intestine which was protruding was torn across in two places into three pieces. Later a large roundworm was found on the stretcher on which he had been carried.

*Operation*—In the absence of the assistant surgeon I had to depend solely on the help of the hospital dresser and compounder for this operation. The instruments, etc., having been sterilised and the protruding coils of gut washed well with warm saline, four Doyen's clamps were applied to the gut, two on each side of the injured portion. Some three-quarters of an inch of the injured gut between was then removed with a blunt-pointed bistoury, together with a triangular piece of mesentery, with its base at the injured part of the gut.

A circular enterorrhaphy was next carried out, joining the severed portions of gut by an end to end anastomosis. Interrupted fine catgut sutures were used in order to avoid narrowing the lumen of the gut, and a final continuous Lembert suture all round through both peritoneum and muscular coats. Finally the margins of the mesentery were brought into apposition by a continuous silk suture. The coil of intestine was now well washed with warm saline and reduced into the abdominal cavity without difficulty.

The perforation through which the gut had prolapsed was next narrowed by deep sutures with thick catgut, the injured scrotum washed with perchloride solution and painted with tincture of iodine, and the superficial wound

closed with silkworm gut ligatures, leaving a small opening for drainage.

During operation one cc of pituitrin was given hypodermically, and at its close a half grain suppository of morphia given per rectum. The patient was put to bed covered with hot blankets, and hot water bottles placed at his sides and between the legs. The foot of the bed was raised six inches.

*After-treatment*—Early next morning ten cc of antistreptococcal serum (polyvalent) was injected, and nothing allowed by the mouth for the first 24 hours except sips of warm water when thirsty. The patient was kept continuously on his back for three days. Rectal salines were started eight hours after operation, 4 ozs every 4 hours.

The patient complained of slight pain almost every evening and sleep was disturbed, so a quarter of a grain of morphia sulphate and 1/200th of a grain of atropine sulphate were ordered each night if there was insomnia.

On the 11th day gruel and clear soup were permitted and on the 21st day soft rice gruel, broth and dal soup.

There was no further abdominal complaint but the scrotum became gangrenous in places and sloughed. Hot perchloride of mercury compresses were continuously applied and hydrogen peroxide used at each change of dressings. Later a cough mixture for a slight cough and still later an iron tonic and syrup of hæmoglobin were given, as the patient looked decidedly anæmic about the third week.

The temperature after operation never rose above 100°F and the patient was allowed to sit up in the reclining posture after two weeks, and after four weeks to walk on the verandah. On the 31st day after operation solid rice was allowed, and he left the hospital in sound health on the 37th day after the injury.

### ASCARIS LUMBRICOIDES AND SEVERE HÆMORRHAGE AS COMPLICATIONS IN A CASE OF MIXED TYPE OF DYSENTERY

By P B KARKAREY, M.B.,

Nagpur, C P

A HINDU male, aged 49 years, a goldsmith by occupation, had a severe attack of dysentery of mixed type (bacillary and amœbic). On castor-oil emulsion the stools were fairly healthy on the second day, whereupon the patient discontinued taking the mixture. On the third day he commenced to pass streams of blood per rectum, and the relatives having become alarmed, I was called in.

When first seen, the patient was in a sinking condition and 1 cc of Hæmoplastin (P D and Co) was given hypodermically, followed

soon after by half a grain of emetine hydrochloride. The bleeding now ceased, but the pulse continued to be thready. One cc of camphor in oil was accordingly administered, and the patient's condition improved, the pulse tension becoming better.

Castor-oil, bismuth and opium mixture was next given, with a light diet of barley water and sherbet, and a hot flannel binder applied to the abdomen. The dysentery, however, continued with streaks of blood in the stools. A change was therefore made to salol with sodium bicarbonate.

Two days after commencing the powders, I was informed that the patient had vomited a roundworm, 12 inches in length. At night, accordingly, a powder of 3 grains of santonin with 20 grains of sodium bicarbonate was given. A bundle of ten roundworms was passed and on continuing this line of treatment, 32 worms were passed in all.

Simple astringent mixtures and bismuth powders were next administered, with a restricted diet, and the patient made a speedy recovery. Two months after the onset of his illness he was back at work.

The recovery after so severe an attack and with a heavy *Ascaris* infection in an elderly man was very satisfactory. No relapse occurred.

#### A CASE OF A PERFORATING INJURY OF THE EYE FROM A FOREIGN BODY, AT THE CLINIC OF WIEDENKRANKENHAUS, VIENNA

By A D SHROFF, M.B., B.S.,

Royal London Ophthalmic Hospital, City Road,  
London, E.C.

WHILST recently attending this clinic on my way to London, I saw a very interesting case of injury to the eye by a foreign body. The details were as follows—

The patient, Melzer Franz, aged 27 years, is a blacksmith by occupation, and a week before admission to the clinic, whilst he was hammering on the anvil, a particle of iron sprang from the anvil and hit his eye. Whether it had entered into the globe or not he could not say.

On examination vision was 6/12ths. Under the conjunctiva, just near the limbus about the 9 o'clock position, a dark point was visible. At 10 o'clock position at the inner border of the ciliary portion of the iris, a square hole was present, the size of a small pin's head. On dilation of the pupil with atropine a fine white streak of opacity was seen, beginning just behind the hole in the iris and leading outwards and backwards to a bigger circumscribed opacity, the size of a large pin's head.

On ophthalmoscopic examination, a brightly glittering foreign body was visible in the retina in the lower part of the fundus. Its surface could be seen with a +8, and the surrounding fundus with a +3 lens. The fundus around the foreign body shewed yellow patches with pigment spots. The rest of the fundus was normal.

On attempting to extract the foreign body with the big electro-magnet, the patient did not complain of pain. The foreign body did not move at all, and for two days unsuccessful attempts were made at its removal.

On making a similar attempt on the third day, however, the ophthalmoscopic picture was substantially altered. At the former site of the foreign body there was now only a fine hazy spot of exudate, the foreign body was now further forward in the eye, and could be seen to move in response to the magnet to nasal and temporal sides in turn.

Two further days were spent in attempts at extraction by the electro-magnet, but without success. Finally, an incision was made a little below the limbus through the conjunctiva and sclera, and the point of the magnet introduced into the eye. The foreign body immediately sprang to the magnet, and was withdrawn without loss of vitreous.

It proved to be a flat particle of iron 1 mm long and some  $\frac{1}{2}$  mm broad, and weighed half a decigramme. At 10 cm distance from the magnet it moved only very slightly, at 8 cm distance it followed the movements of the magnet, from 2 cms it sprang to the magnet.

The patient was discharged on the 14th day after admission. The wound had healed completely. The condition of the retina at the spot where the foreign body was embedded was unaltered, the rest of the fundus and vitreous were normal. Vision was 6/12ths, and with a +1 lens 6/9ths.

There are several features of interest in the case. The absence of all painful reaction is one. Secondly, one should not conclude that a foreign body half embedded in the retina is *not* iron because it refuses to move towards an electro-magnet. The exact position of the foreign body should be located by examination with the ophthalmoscope or by scleral lamp examination. If this is impossible, on account of opacity of the lens or through hæmorrhage or swelling, an X-ray photograph should be taken. Such a case had occurred in the clinic, where, owing to hæmorrhage in the vitreous, the foreign body could not be located, but was shewn by X-rays and was extracted after two or three days, when the hæmorrhage had subsided. Vision in this instance, after removal of the foreign body, despite the hæmorrhage and swelling, was 6/6ths a few days later.

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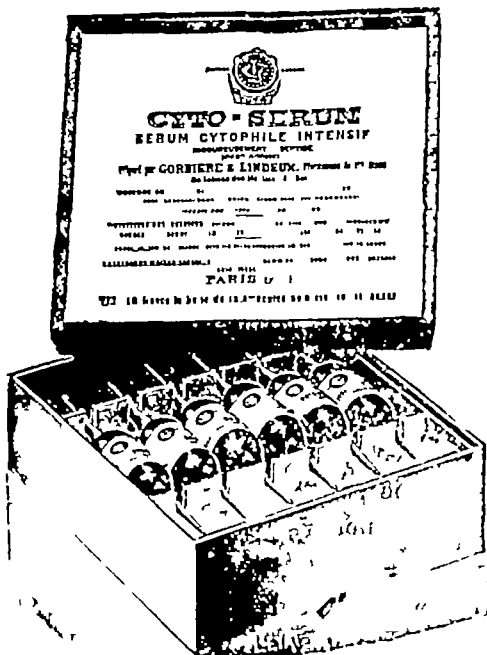
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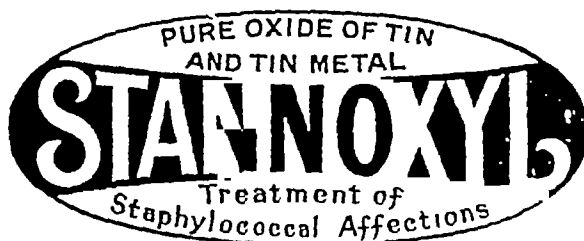
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method of bougies for induction. At the same time students can be taught the anatomy of the pelvic diaphragm and the results of its laceration—cystocele, prolapse or rectocele. Finally the most important point of obstetrics, namely, the proper understanding of Munro Kerr's manœuvre, can be demonstrated by the simple means of placing a large roller bandage under the Turkish towel between the sacral promontory and the baby's head. Indeed I do not know anything in the realm of teaching more convincing than a live baby overlapping the brim of such a dummy. The principles of a test labour, induction or Cæsarean section can then be demonstrated and the whole subject of contracted pelvis, or a big child, mature or post-mature, can be made perfectly manifest, for each student can in turn do the manœuvre.

It is hardly necessary to dwell upon the immense importance of indelibly carving on the memory of Indian students this manœuvre, for a great proportion of the cases to which practitioners in this country are called are "late cases" in which the head of the baby is floating above the brim.

So on and so forth, the whole gamut of obstetrics can be gone over, and if this subject be taught in this way before the student goes up for his examination and is permitted to conduct his six cases, or goes into practice, it will be found peculiarly gratifying to observe the intelligent accuracy with which what I might call the 5 cardinal points of obstetrics are grasped, i.e. —

1 The relation of the foetal head to the pelvic brim

2 Whether the maximum circumference of the head is fixed in the brim or no

3 Whether the head is flexed or no

4 Where the back and limbs are

5 What is the transverse diameter of the outlet. This is a very common type of pelvic deformity in the East, and as in the East vaginal examinations are not readily obtained, I have adopted a simple guide which can be carried out by anyone without unnecessary exposure. My teaching rule is, that if by dimpling in the covering sheet you can place three fingers transversely in the subpubic angle between the pubic ramus, then all is well or normal between the ischial tuberosities. This clinical finding or manœuvre has never failed me and is of extreme importance for doctors dealing with sensitive patients.

When the student has fully grasped and visualised every normal and abnormal presentation, even including twins, for two small babies can always be found in every lying-in ward, he may then proceed to learn operative midwifery.

The above method of teaching is so great an improvement, and the live interest of students so convincing, that I am emboldened

to think that if teaching institutions in India will try it, not only for students but also for nurses and *dhais*, they will revolutionize the obstetric art of the future generation, for a good teacher can take up every day (1) some subject of the antenatal care of mother and foetus (2) The subject of the neo-natal baby and its care (3) The physiology, pathology, and treatment of every condition can be made a clinical lecture day by day.

The whole success of this *live method* of teaching depends upon the flair and enthusiasm of the teacher, and for those who are sceptical I can assure them that the live interest of Indian students in a subject for which few of them have any natural bent is extraordinary, for this method with its baby lying in its warm crib is vital and convincing, and moreover it does away with that boredom so often shown with mechanical contraptions.

There are a few points which the teacher must observe —

(a) The room must be warm and near the lying-in ward

(b) Each class should not be more than 20

(c) A nurse should always be present.

(d) The dummy should be large and soft-lined

(e) The baby should be a small and healthy one, and should have been recently nursed, if this is so, it lies perfectly happy in its warm soft crib and in a whole year I have very rarely heard even a whimper, for even when turned it soon settles down to sleep again.

(f) The greatest gentleness and supervision are necessary, and where the teacher is known and trusted not the least difficulty will be experienced in obtaining the consent of any mother, British or Indian for what one is trying to do, and what if need be can be explained to the mother, is to save the lives of perhaps countless women and babies by efficiently teaching students, nurses, and post-graduates the art of obstetrics from alpha to omega.

In this country as well as abroad, thousands of mothers lose their lives every year as a result of operative midwifery, therefore it must be our endeavour in future to teach this subject as we do operative surgery.

The method I would advocate presents no difficulty, for every institution from time to time furnishes its morgue with dead or unwanted neo-natal corpses, therefore all we have to do is to obtain a dummy exactly as before only lined with zinc. Into this is placed a recent body, then one by one, student by student, the whole gamut of operations (excepting Cæsarian section) is carried out. Forceps, hook, decapitator, perforator, and cranioclast, are used one by one, each operation being made a clinical lecture and every

detail, indication, contraindication, and complication dealt with

Finally if the circumstances of death are doubtful, before perforation and cranioclasm, an autopsy is performed with a view to discovering whether there are any of those intra-cranial injuries which have been so ably depicted by Mr Eardley Holland

I feel, that if in all institutions Indian students were taught on these lines, the reproach of the General Medical Council would be no longer valid, provided the students conducted six cases and witnessed at least fourteen

Moreover what is to my mind of almost equal importance is that if our municipal *dhais*, district visitors, and nurses were trained or taught the first or *live method*, together with the whole principle of ante-natal care, we should have in a few years circulating, snow-ball fashion, throughout India a very great appreciation of Western methods, and thereby save colossal loss of life and morbidity, for the fog of ignorance and fear which surrounds expectant mothers would then dissipate

This method I am advocating is cheap, easy, interesting and convincing for every mechanism can be watched, every manœuvre, such as Pinard's, or version practised, every difficulty or abnormality demonstrated and so the student cultivates a visual and tactile memory which is invaluable and lasting

V B GREEN-ARMYTAGE

### THE OTHER SIDE OF THE PICTURE

SOME of our readers may think that our editorial article of last month did scant justice to the achievements of British Rule in India. We emphasised the fact that the loss of human life resulting from war in India had been reduced to a negligible quantity during the past fifty years, but we also stated that disease and poverty still hold far too firm a grip of the country. While we see no reason to retract a single word that was written last month, we are quite prepared to admit that much has been done to improve the condition of India by British rule. Sir William Vincent has recently shown that India in the time of Akbar far from enjoying a golden age was rightly described by a Dutch writer as "the home of stark want and the dwelling place of bitter woe." Life and property were insecure, the population consisted of only a hundred millions of people who suffered not only from poverty of the most extreme kind but also from the horrors of constant civil war and repeated invasions. Since that time British rule has eliminated internal warfare invasion by foreign hordes *suttee*, *thugges*, and the ever present danger of oppression and sequestration of private property. The demands of the State on the revenues of the people are much less than

they were in the time of Akbar, 56,000 miles of metalled road and three times as many miles of unmetalled road have been added, there are 37,000 miles of railroad, deserts have been converted into valuable cultivated areas by extensive irrigation, great industries have sprung up which bring prosperity to many, the population has trebled and as an indication of the growth of wealth it is pointed out that India has absorbed 250 million pounds worth of gold in twenty years in addition to a much larger amount of silver. There are other services which have been rendered by England and other countries to India which have been due to or associated with the establishment of British rule.

The amount of money that has been spent by philanthropic agencies in India is very large, to take only one example, the Methodist Episcopal Mission of America is spending about 45 lakhs of rupees yearly in India and most of the money is spent on education and medical relief.

It is only fair that this side of the picture should be studied as wrong impressions are conveyed by the reiteration of such phrases as "foreign oppression," "the drain of India's resources," and by references to the departed "golden age" of India.

The frank recognition of the debt that India owes to Britain does not in the least degree weaken the arguments which we used in our last editorial. Britain may rightly insist on what she has done, but at the same time she must recognise that a vast amount remains to be done in the future. The country is still suffering from a terrible drain in health, life efficiency and resources from preventable disease and remediable ignorance. The time is ripe for a great forward movement in which Britain and Educated India are bound to co-operate if they have the interests of both countries at heart. The methods by which this policy can be carried out must be the subject of a comprehensive enquiry in which the British Government, the newly constituted Government of India and the "non-co-operating" intelligentsia of India will combine their forces. There must, of course, be no weakening of justice, order and security which are the foundations on which the prosperity of the country rests. The best means of securing these is the adoption of a great constructive policy in which every one of the complex forces of India can combine. The country has already shown signs of dissatisfaction with the panaceas which have been advocated as remedies for its discontent. It is certain that a well-thought-out programme for the advancement of the health and prosperity of the country as a whole will be the best corrective for the racial and sectional antagonisms which threaten to destroy the solid progress which

has already been achieved. The special interests of British officials, of educated Hindus or Mahomedans, of Brahmins or Non-Brahmins, of commercial or agricultural workers, matter but little, what is of essential importance is that the condition of the whole mass of the population of India should be improved. Non-co-operation thrives and will continue to thrive because the people are vaguely conscious that they are in a condition of economic depression and of ill health, they must be shewn that active measures are being prepared for the cure of their ills. When these are instituted the intellectual and moral forces of India can be expected to turn aside from the suicidal struggle for the advantage of one section of the community at the expense of the other, they will become concentrated on the promotion of the well being of the whole community.

Is it impossible to unite the forces of India under one standard for the carrying out of an intensive campaign against disease and poverty? We are sanguine enough to think that it is quite possible to do so, at any rate it is possible to try. Should an honest effort fail, it will be time enough to be pessimistic as to the future of India.

## Current Topics.

### "Tubercle."

TUBERCULOSIS is so terrible and so important a problem in medical practice in India, that many practitioners in this country will be interested in *Tubercle* a monthly journal dealing with all aspects of tuberculosis, and published by John Bale, Sons and Danielsson, Ltd, 83-91, Great Titchfield Street, London, W 1. The new volume commenced with the October 1923 number, and the journal is published monthly at a subscription rate of 2s 6d per number, or 25s per annum.

The October 1923 number is a special one devoted to the surgery of the lungs and pleuræ. It includes articles by Dr H. Morrison Davies, M.D., M.Ch. (Cantab), F.R.C.S. (Eng), on "The Progress of Surgery of the Lungs and Cavity", by L. W. Shellew, M.C., B.C. (Cantab), on "Anæsthesia in Thoracic Surgery", and special articles by Dr P. K. Brown, Dr L. Elsesser, Prof. P. Bull, Prof. H. J. Jacobæus, and Dr E. Kay. Prof. L. Brauer deals with thoracoplasty, and the editorial with the future of thoracic surgery. A bibliography of the articles on thoracic surgery from 1920 to date is included, together with a separate section on empyema.

### Enquiry on Malaria, Blackwater Fever and Ankylostomiasis in Singhbhum. Report No. 1

By S. R. CHRISTOPHERS, C.I.E., O.B.E.,

LIEUT.-COL., I.M.S.

From —The Supdt. Govt. Printing Patna,  
Bihar and Orissa

Most malarial surveys are of interest, but one by Colonel Christophers is of especial interest. Singhbhum

is a mining and iron field of about 3,000 square miles, of considerable importance on account of its enormous mineral wealth, and is the headquarters of the Bengal Iron Company's Mines. The country investigated consists of forest-clad hills, running up to an elevation of 3,000 feet, intersected by rivers with accompanying ravines and alluvial tracts. The labour employed by the Company is mainly permanent and is housed in lines, and consists of some 1,250 coolies arranged in the three settlements at Manharpur, Duia and Chiria. It is also of a fairly settled character. In addition there are employees of the driver and fitter class, largely Mahomedan, Bengali clerks and overseers, and the European staff and their families who are housed in seven bungalows.

A preliminary survey of 228 persons employed gave an average hæmoglobin percentage of 72 per cent, the percentage for individuals with enlarged spleens working out some 10 per cent lower. Two individuals who shewed respectively 30 per cent and 20 per cent hæmoglobin readings shewed also respectively 700 and 4,000 ankylostome ova per gramme of fæces. The spleen rates in the different sets of lines varied from 17 per cent to 77 per cent, and children of ages 3 to 5 years shewed the largest incidence of enlarged spleens. Of 208 children examined, no less than 178 were found infected with malarial parasites, an endemic index of 85 per cent, and at Manharpur the average number of parasites per c.mm. of blood was no less than 6,492.

In brief what Colonel Christophers finds is that from the ages of one to two years most, if not all, Indian children in the areas concerned pass through a stage of continuous malaria infestation with symptoms of malaria, —acute febrile infestation. In children aged 2 to 5 years the proportion infected is still as high as ever, but the average number of parasites found per c.mm. is lower, and there is less fever. From the age of 6 to 10 years the infestation rate is still approximately 100 per cent, but the degree of infection is below the febrile threshold. In fact the conditions here present throw a vivid light upon the conditions present in areas of hyper-endemicity. The youngest children up to 2 years of age get malaria as an almost continuous infection, those from 3 to 5 years of age are just as heavily infected but suffer less from fever, those from 6 to 10 years of age become afebrile malarial carriers. In the adult, tolerance to parasite infestation has been acquired, and the spleen rates are approximately over 50 per cent for children and 10 per cent for adults. Fifty per cent of adults still shew malarial parasites in their blood films.

Given European immigrants and their families entering such a hyper-endemic zone, acute and repeated attacks of malaria at once follow. The prevailing anopheline carriers are *A. willmori* and *A. listoni*, the latter being probably the more important. The situation of lines for coolies and of bungalows for European staff have been selected without consideration of the breeding places of these species in the rocky streams and riverine beds, cliffs and bluffs being selected as a rule.

What measures should be undertaken to remedy such a state of affairs, it is difficult to say. Subsoil drainage of stream channels and training of the rivers is the obvious remedy, and this should be employed at least for the streams at Manharpur, but would be very costly elsewhere. In some instances rebuilding of bungalows and lines on new sites would probably prove less expensive. On the other hand the settled adult labour is already so acclimatised to malarial infestation that the rebuilding of lines may perhaps be postponed.

The whole enquiry only lasted for three weeks, but Colonel Christophers' report is one of the most striking which we have seen, especially in its lucid and dramatic representation of the incidence and course of malarial infestation in the children and adults of a settled labour force. The screening of European bungalows is advised as the measure most immediately possible together with the prophylactic use of quinine.

## Aches and Pains of Renal Origin

B. ANDREW FULLERTON, C.B., C.M.G. F.R.C.S. F.A.C.S.,

*Surgeon to the Royal Victoria Hospital, Belfast*

B M J, Feb 24th. 1923, p 309

THE records of upwards of 1,500 successive cases of cystoscopy, show that the most extensive disease of the kidney may exist without any pain whatever, and, on the other hand that a very slight departure from the normal may be associated with almost unbearable agony, also that a precisely similar condition may, in one patient give rise to the merest local discomfort, and in another to pain of a severe character, radiating to the utmost terminations of the peripheral nerves.

The most frequent cause of renal pain and renal colic in its worst form is renal calculus. In 72 consecutive cases pain was present at some time or another in all but two. The pain was of the most varied character. The radiation of the pain in these calculus cases varied greatly. Most usually it radiated towards the groin, testis or labia majora, frequently over the buttock or down the inner or outer side of the thigh, sometimes into the penis, sometimes down the leg as far as the heel or toes and occasionally all over the abdomen.

Occasionally renal pain is due to the passage of crystals of calcium oxalate, and probably other insoluble salts in the urine may cause pain. In many of these cases of renal calculus frequency of micturition, especially during the attacks of pain, was complained of. This was apart from any associated cystitis or other bladder affection. Reflex vomiting, pallor, and cold sweats were exceedingly common in the severe attacks.

Renal pain is not a cardinal symptom of tuberculous kidney. In 117 consecutive cases pain was complained of in 56 cases only. Even in advanced cases pain may be entirely absent. In most of the painless cases there was thickening of the ureter, and in many very extensive destruction of the kidney substance. In the painful cases the symptoms resembled those occurring in renal calculus, but were rarely so severe. It was described as an ache or a soreness more or less constantly present, or a feeling of fullness on the affected side. Attacks of renal colic were, however not uncommonly met with, but these rarely attained the intensity of those due to calculus. A few patients stated that the pain started in the bladder and radiated up into the kidney of the affected side. Some complained of "soreness" in both kidneys, and in a few the pain was on the side opposite to the seat of disease. Radiation of the pain was somewhat similar to that found in calculus. In one case the pain radiated to the shoulder on the affected side. Vomiting and pallor with sweats were less frequent than in the case of stone.

Pain is a very frequent symptom in pyelitis. Thus out of 75 cases pain was present in 59. In the acute cases with rigors and fever vomiting, pain and tenderness with perhaps palpable swelling of the affected organ and muscular rigidity were commonly present. The pain was more fixed and constant than in calculus and tubercle, and was not generally so severe as in calculus. Even in the acute cases, however, pain may be entirely absent. In chronic cases pain is often absent and the affected kidney is only discovered by cystoscopy or ureteral catheterization.

In hydronephrosis and pyonephrosis pain is a frequent symptom. Out of 37 cases examined pain was present in 31, and doubtful in 2. The pain, like that due to calculus and tuberculosis, varied very much in character and distribution. A very frequent history was that of pain and a tumour in the side, associated perhaps with vomiting. It is noteworthy that the radiation of the pain resembled very closely that seen in renal calculus. The pain in certain cases of hydronephrosis and pyonephrosis may rival in severity that found in renal calculus.

Pain may be entirely absent in cases of renal tumour. It was present in 11 out of 18 cases recently examined.

It was described as a soreness, a dragging pain, pain and tenderness or severe renal colic.

In some cases of hæmaturia pain may be absent. In others the well known symptoms of renal colic are present.

Pain is often present in cases of movable kidney, but this condition is so commonly associated with other manifestations of visceroptosis that it is difficult sometimes to apportion the blame between the various organs concerned. On the right side especially it may be impossible to differentiate symptoms of appendicitis, mobile cæcum, and other abdominal affections from those due to displacements of the kidney, and mistakes in diagnosis are often made.

Renal pain may be due to some condition of bladder or urethra. Carcinoma of the bladder, a papilloma at a ureteral orifice, an enlarged prostate, or stricture of the urethra may cause renal pain on one or both sides from back pressure.

Mr Fullerton admits that he has only too frequently seen cases of renal colic in which he has been unable to trace the cause. In some of these the urine has been perfectly normal and X-ray examination negative. In a certain number the only indication of a renal origin has been diminished specific gravity on the affected side.

Recent advances in the methods of examination will reduce the number of undiagnosed cases and add to the satisfaction of all concerned in the investigation and treatment of these elusive complaints.

The idea running through this address is that the pain is due in a large proportion of cases to distension of the renal pelvis. Treatment should be directed towards removing the cause, and involves in some instances ablation of the kidney.

## Castellani's Broncho-Spirochætoxis

Few subjects have raised more discussion than Castellani's original description in 1905-06 of a form of bronchitis simulating phthisis, with both acute and chronic forms and due to a causal spirochæte, *S. bronchialis*. Since Castellani's original description the infection has been described from almost every country in the world, but several workers have claimed that the spirochæte is an accidental and not causal parasite in the sputum whilst Vincent and others consider that Castellani's bronchitis is Vincent's infection, affecting not the throat, but the bronchial mucosa.

In the *Journal of Tropical Medicine and Hygiene* for the 2nd of April 1923, Vol 26, No 7 p 103, Dr Najib Farah, formerly of Beirut, discusses this disease, a very complete and useful bibliography at the end lending special value to his review. So far all attempts at culturing the spirochæte and all animal experiments have had negative results.

In describing the symptomatology the author divides the disease into acute, subacute and chronic varieties. The acute type may simulate influenza, with a sudden onset with chill and fever, the physical examination of the chest reveals few if any signs, and the hæmoptysis may be slight but is more usually severe. The subacute variety may follow on the acute attack but more often sets in insidiously with scanty reddish gelatinous sputum. The chronic variety has a variable and protracted course with attacks of hæmoptysis, the characteristic red current jelly sputum being typical, whilst examination of the chest reveals little or nothing. The author gives two x-ray photographs, one shewing some loss of transparency at the root of the lungs after 18 months' duration, the other shewing zones of sclerosis after 8 years' duration.

The chief interest of Dr Farah's paper, however, is his account of a fatal case of the infection with pneumonic consolidation of both lungs. The patient, a man of 23 previously in perfect health, was taken suddenly ill with chill and high fever, and a few hours later coughed up enormous quantities of blood. The hæmoptysis was so severe that, when seen on the third day of

illness by the author, the patient had to adopt an absolutely motionless dorsal decubitus to avoid hæmorrhage and his bedclothes were soaked with blood. The general state was very bad, the left lung shewed hepatization in its upper half, and the temperature was 40.3° C. On the 8th day of illness the temperature fell by pseudo-crisis, but a further rise of temperature and a crisis of hæmoptysis ensued and signs of hepatization were now observed over the left base. On the 13th day there was again a pseudo-crisis, the temperature fell, only to be succeeded by a further rise, another attack of hæmoptysis, and consolidation of the upper part of the right lung. On the 17th day there was again a pseudo-critical fall of temperature, followed by excessively severe hæmoptysis and both lungs became consolidated. The hæmorrhage on this occasion was so severe that calcium chloride orally and injections of gelatine and horse serum failed to affect it. The patient died on the 21st day of illness, the temperature chart having shown four distinct pneumonic periods, with—in each interval—a pseudo-crisis associated with hæmoptysis. No post-mortem was allowed. During the whole course of illness all examinations for T B or other pathogenic micro-organisms gave negative results, and the only micro-organism found repeatedly and in abundance was Castellani's spirochæte.

From a description of this case Dr Farah passes to a consideration of pleuritic and asthmatic varieties of the disease, gangrenous and fœtid types, and the possible modes of infection. Usually the disease is not fatal, even in the fœtid types, although gangrene of the lung is a serious form. By way of treatment Castellani first recommended arsenic and tartar emetic. The author has tried neosalvarsan compounds with little benefit. He finds, however, that the drug *par excellence* is lipiodol, which contains 54 per cent. of iodine in poppy oil, and gives one or more courses of 3 to 6 injections, each of 2 c.c., on alternate days or every third day. The injections are given intramuscularly and no symptoms of iodism have been noted. For hæmoptysis calcium chloride is given internally. Local measures to the nose and throat may also be necessary, as the infection may involve them, and a subsequent course of tonics is given during convalescence.

Dr Farah's pneumonic case is of interest as the symptomatology described, with its repeated attacks of hæmoptysis and the pseudo-crises, must be admitted to differ from that of relapsing pneumonia due to other causes.

### A Case of Quinine Idiosyncrasy

In the *Transactions of the Royal Society of Tropical Medicine and Hygiene* for November-December 1922, Vol. XVI, Nos. 5 and 6, p. 326, Dr C. Grantham-Hill describes a case of quinine idiosyncrasy of considerable interest. The patient was a Syrian Government official, living in Khartoum, who had never previously had malaria and had never taken quinine. One day when slightly off colour he took one 5 gr. tablet of quinine sulphate. Within an hour he was taken ill with dyspnoea, vomiting, diarrhoea, and a red rash which covered the body.

On October 10th, 1922 he contracted fever. He informed his medical attendant of the previous occurrences after quinine, but a dose of 5 grs of euquinine was administered. An hour later the patient had headache, nausea, vomiting, watery diarrhoea and the body was covered with an urticarial rash. The respiration was shallow and rapid and the pulse 130. Admitted next day to hospital the rash was fading, the temperature was 99° F, and although no parasites were detected in films, there was a suspicious increase of large lymphocytes. As it was considered too dangerous to give quinine 0.9 gm of novarsenobillon was given by intravenous injection in two doses on consecutive days, and Fowler's solution by the mouth. Fever continued and the spleen increased in size. Three days later a further 0.9 gm of novarsenobillon was given, but the arsenic treatment completely failed.

Resort was now had to minute doses of quinine, grain  $\frac{1}{2}$  orally. This, however, was vomited. Finally the patient was put on to increasing doses of quinine intramuscularly, rising from gr  $\frac{1}{2}$  morning and evening to grs 6 morning and evening. The fever disappeared, and the patient was finally able to take 5 grains orally twice a day for three weeks without symptoms. One day, however, he omitted the oral dose, and the next day had a slight attack of dyspnoea lasting for half an hour after the morning dose.

The case is of interest as shewing the inefficiency of arsenic, the rapid acquirement of tolerance and its rapid loss.

### The Home Treatment of Internal Hæmorrhoids

DR C. H. SHELLY of Hertford writes in the *Practitioner* (Sept. 1923, p. 211), on the subject of "The Home Treatment of Internal Hæmorrhoids." He prefaces his article by stating that in almost all cases of internal piles, provided that the patient is otherwise in a fair state of health, the best and most satisfactory treatment is that by ligature and scissors.

But there are certain cases in which the surgeon may have good reasons for advising against operation. There are many more in which the patient is very strongly opposed to operation. In these much may be accomplished by the patient himself towards achieving relief and comfort, by practising a simple routine procedure and by adopting a more hygienic course of life.

The first step is to empty the intestines completely of all hard scybalous matter, and to take effective measures for preventing any approach to constipation thereafter. The injection of oil is followed by large warm soap and water enemata given with the patient lying on his right side so as to favour lavage of the transverse colon, with or without occasional doses of castor oil.

The enemata etc., must be continued until the motions have been quite free from discrete scybala for at least three days; they must be resumed should any scybala be again detected. Afterwards their place may be taken by a compound rhubarb pill with Pil Hydrarg., gr 1, or, once or twice a week, Hydrarg. subchlor. gr 1. The patient should take little, if any, fluid with his meals, but sip a tumblerful of water or lemonade—hot or cold, as is preferred—not less than an hour and a half before each meal. All kinds of food must be thoroughly masticated to a thin pulp before being swallowed. The bowels should be induced to act at least once, and not more than twice, every day, and matters should be so regulated that the motions are properly formed and of the consistence of fairly firm porridge.

Upon each occasion that the bowels act the anal region is gently cleansed with soft paper or a swab of absorbent cotton wool and the projecting hæmorrhoidal mass firmly dabbed with a swab of absorbent wool soaked with clean water for nineteen times in succession.

The bleeding may now have stopped, at all events, it will have been appreciably lessened. From a tube of linoline-hazeline ointment, a portion about the size of a large pea should be squeezed on to the tip of the middle finger of the right hand (the finger-nail having been covered with a finger stall) and with this the whole surface of the protruded mass should be gently and thoroughly smeared. Then, with the three middle fingers flattened out close alongside each other, the hæmorrhoidal mass should be steadily and firmly pressed upwards while the sphincter is first completely relaxed and then momentarily contracted; this alternate contraction and relaxation must be continued while the firm upward pressure is steadily maintained throughout. Gradually, the mass will dwindle in bulk, until it passes completely within the grasp of the external sphincter and is returned within the anus. As it slips within the anus it should be followed by the tip of the anointed middle finger which continues to push the piles backwards and upwards as far as possible within the bowel—by which time the finger will have entered the bowel.

about as far as the middle of its second phalanx. All this time the alternate contraction and complete relaxation of the sphincter in quick alternation should be maintained. The tip sides, and back of the finger are now pressed firmly in all directions against the wall of the bowel—north, south, east, and west,—while the sphincters are maintained in strong contraction for half a minute at least.

The anus should now be again swabbed with cold water, for another nineteen times while the sphincter is kept in a state of contraction. The anal region should then be dried with soft paper or dry wool, and finally be briskly rubbed with a wad of soft crumpled paper, not too thin, printed paper should never be used. The patient should then lie down at full length on a firm couch or bed, with his head only on the bolster and a couple of firm pillows beneath his buttocks, for twenty minutes. If the bleeding has been at all profuse this opportunity should be seized for gently injecting a small quantity—oz. ii to oz. iii—of cold water into the bowel, this will be retained with beneficial results. A moderate proportion of hazeline may be added if desirable.

When the piles have ceased to bleed for some few days, the lying down and the cold enemata after each defecation may be gradually abandoned whilst the anointing of the protruded bowel before it is returned within the anus will not be required on every occasion. After a little while even if a hard and bulky motion has to be passed the patient will be agreeably surprised to find that this is not attended or followed by hemorrhage. In all other details the procedure must be persistently carried out. A great increase of comfort, both local and general of bodily well-being and efficiency is secured, and if the patient eventually consents to the more radical operation he will be all the better fitted, generally as well as locally, to undergo it and to benefit thereby.

A call to defecation should be promptly attended to. The act of defecation should not be prolonged any longer than is necessary. Whenever the piles "come down," they should be replaced (as previously directed) as soon as possible.

Deep breathing—of fresh air—should be regularly practised. The patient should take all the active exercise which he can achieve, without undue fatigue, every day of his life—and in the open air, without any dawdling or loitering but he must not stand about afterwards.

The patient may take any ordinary food which he can digest, provided that this is taken under conditions favourable to its digestion (the most important of which is thorough and complete mastication of every morsel of food—be that hard or soft) and that at each meal he takes no more than his digestion is equal to dealing with. It is most important that the teeth are efficient and kept in good order.

If hemorrhoids prone to extrusion threaten to become inflamed antiphlogistine spread on a double fold of lint should be applied to the mass as hot as the patient can bear, covered with a good pad of cotton wool and kept in place by a perineal bandage, the patient being confined to bed with the foot of the bedstead well raised. Relief is prompt, and it will be found that the softened and shrunken mass can before long, be easily returned and retained within the sphincter. Should the piles be chafed and tender making attempts at reduction very painful they may be anointed with a little of Oppenheimer's Ung. Anæsthet, Renaglandin. Within a few minutes the mass will have become reduced in bulk and relatively insensitive permitting of its easy manipulation and return within the bowel. But the ointment must be used sparingly and at rare intervals—twice a week or two only at the most—or secondary results may ensue.

### The "Acoustique"

A WRITER in the *Medical Press* (July 18 1923, page 58) who is deaf himself recommends the "Acoustique," manufactured and sold by its inventor, Mr. R. H. Dent,

of 95, Wigmore Street, London, W. This instrument is a very portable one of various types and sizes there being now no fewer than twenty-five distinct varieties to choose from, owing to the recent improvements introduced by the inventor to meet the special needs of each case.

After testing personally and practically for several weeks two or three of these instruments the author of this brief note, who is himself deaf, has come to the conclusion that nothing has given him such complete satisfaction in the way of hearing as the "Acoustique." He has used one as a pocket companion which enabled him to hear and carry on ordinary conversation with ease. He has tried one whose transmitter was placed on a table in a small box about four inches square connected with an almost imperceptible ear-piece with most astounding reasonance, making him feel for the nonce that he was no longer deaf. Finally, he would remark that there is no quackery about these instruments; they are so far the best aids for the deaf known but to obtain the desired results, sufferers must be fitted personally from the long range of "Acoustique" with the type most suitable for the individual case.

### The Treatment of Bone Infections

In the *Nebraska State Medical Journal* for February, 1923, Vol. VIII, No. 2 p. 50, Dr. Winnett Orr expresses his dissatisfaction with present-day methods of treating septic infections of bone. He writes—

"Among the measures that we have been exhorted to employ are debridement with primary or with secondary closure of wounds, the Carrel-Dakin method, zinc solutions, etc. Secondary sterilization by operation and closure has been extensively employed, and all the old and new resources of asepsis and antisepsis in the treatment of chronic infections have been tried. In spite of all these, however, there still remain not only in the military hospitals but in civilian hospitals and in private homes, thousands of patients with chronic discharging infected sinuses which lead from the skin surface through openings large or small down to infected bone. These are accompanied in many instances by serious deformity or disability of the affected part, whether the bones are those of the spine or of the extremities.

The writer of this paper has seen not only in print but in the military and civilian hospitals every phase of this problem. Not only that, he has himself during twenty years of practice tried most of the methods which with some of the new ones, he thinks should now be discarded in the treatment of these conditions. Most of the methods have definitely been found to be wanting. The patients do not get well.

In spite of this fact these inefficient methods are still being employed by surgeons and physicians, in a vain effort to heal up sinuses that will not heal.

The writer believes that he has arrived at a fairly standard method which may be employed in the treatment of these conditions. He believes that it is possible to lay down a course which can be applied to practically all such cases and by which uniform, symmetrical and greatly improved results may be obtained.

The fundamental basis of the treatment which I propose is founded upon the principle of rest, and this applies to the wound and the wound surfaces as well as to the larger anatomical parts involved in the injury. First of all then, one must insist that at the time of injury, at the time of primary and secondary treatment, and throughout the entire course of the period of disability, there must be first, restoration of the injured parts to normal relationship and second, immobilization and protection in correct position until complete healing has occurred. This may be accomplished either by plaster or by suitable splints.

As splints are usually put on, however, this is not accomplished at all. In many hospitals and in the hands of many surgeons splints are a source of irritation rather than of relief. Complete immobilization in suitably prepared and properly applied splints never causes pain.



of a case of dyspepsia, cases with prolonged history are divided into those with continuous and those with intermittent symptoms, and the latter again into three groups according to whether there is complete intermittence, attacks with slight discomfort in the intervals, or continuous symptoms with more severe attacks. The relative length of the attacks and of the intervals is similarly made the basis of a division into groups, as is the relationship of pain to food. Each of these groups corresponds to a group of diseases and when the indications thus afforded are considered in conjunction with the physical signs and with the chemical and r-ray findings, an accurate diagnosis can nearly always be made. Cases of visceroptosis supply most of the exceptions, the mimicry of other diseases, especially cancer, being sometimes extraordinarily close.

Rather more than half the book is devoted to diseases of the stomach. The opening chapters deal with the anatomy of the stomach and with the examination of a case of dyspepsia, after which the diseases of the stomach are taken up *seriatim*. The author inclines to the view that acute gastric ulcer is due to infection and quotes some of Rosenow's remarkable experiments on the specific action of certain strains of organisms. For acute ulcer conservative treatment on medical lines is advocated, operation only being resorted to in the presence of recurrent hæmorrhage. A blood transfusion followed by a gastro-enterostomy with closure of the pylorus is then the operation of choice, no attempt being made to find the bleeding point, teaching which is in accord with the practice of most surgeons. Wedge excision combined with gastro-enterostomy is preferred for ulcers on the lesser curvature, and infolding with pyloric occlusion and gastro-enterostomy for pyloric ulcers. Partial gastrectomy he reserves for cases where there is definite ground for suspecting malignancy. Recent work is, however, tending to show that in many cases malignancy can only be detected by the microscope and, seeing that the mortality of partial gastrectomy in skilled hands is only about 7 per cent, it is not surprising that surgeons are tending more and more to adopt the more severe operation. Balfour's operation of cauter excision has never been popular in England and is not advocated. For partial gastrectomy he has discarded Billroth's second method altogether and adopted the Polya retro-colic method, making the afferent loop as short as possible.

The chapters on the technique of gastric operations are very clear, but one notes with regret that no directions whatever are given on the all-important details of the after-treatment and dieting. In the Mayo clinic so great is the importance attached to this, that the physicians resume control of the case after the wound has healed.

The discussion of the end-results of gastro-enterostomy is very interesting, as the author has arrived at the conclusion that success or failure depends on the presence or absence of pyloric spasm or stenosis. Hence the failure of the operation to cure ulcers of the lesser curvature and hence the passage of food through the pylorus some months after the operation in duodenal cases, which may be taken to mean cessation of the spasm and cure. On the same grounds pyloric occlusion is advocated for cases of acute ulcer and after excision of chronic ulcer, conditions not associated with pyloric spasm.

Gastro-intestinal ulcer is believed to be due to the use of unabsorbable sutures in the serous layer; the last few turns of the through and through suture having failed to pick up the mucous layer and so leaving a piece of silk exposed in the base of what soon becomes a chronic ulcer. From a recent discussion in London we gather that Moynihan is of opinion that many of these ulcers are thus caused though he is still an advocate of the hyperacidity theory. Resection and re-suture of the anastomosis with catgut is the treatment advised—often a matter of great difficulty, but the author cured 11 of 13 cases by this method.

In the description of the operation of partial gastrectomy some useful practical points are given for the avoidance of injury to the structures in the gastro-hepatic omentum, the pancreas and the middle colic artery, which should be of value to surgeons who are only occasionally called upon to undertake this operation.

The subject of gallstones is dealt with at length and the different varieties of acute and chronic cholecystitis are described in great detail. The author is a whole-hearted advocate of cholecystectomy, even in badly infected cases. The descriptions of this and other operations on the biliary passages are very clear and well illustrated.

The surgical diseases of the pancreas are difficult to deal with in an interesting manner. Seventy pages are devoted to them and contain an abstract of what is known on this obscure subject.

The final chapters deal with visceroptosis in its manifold aspects. The author is conservative in his treatment and pessimistic as to the ultimate results of the numerous operations advocated for its relief. Though he admits that Waugh's operation gives good results at first, his own experience has been that there was a tendency for the symptoms to return after a time. For Coffey's operation he has a little faint praise, but in both cases he holds that these operations are only justified when the symptoms are limited to the cæcum or stomach. Ileo-colostomy and colectomy he condemns utterly, producing an array of damning figures by various writers. He himself advocates merely the division of bands and adhesions, supplemented by medical treatment and physio-therapy.

We have read this book with great pleasure and interest. The teaching is thoroughly sound and is in accord with the practice of the best exponents of the British school. We can heartily recommend the work to surgeons and to students reading for the higher examinations. The printing and paper are excellent, the illustrations are of high quality and very numerous, and a special feature is the number of charts of fractional gastric analyses and of reproductions of x-ray plates.

**SURGICAL "DON'TS" (AND "DO'S").—By C. Hamilton Whiteford, M.R.C.S., L.R.C.P., Honorary Surgeon to the Plymouth Infirmary. London: Harrison and Sons, Ltd. Price, 3s net. Pp. 46.**

THIS booklet contains a collection of shrewd and caustic aphorisms, published at various times during the past thirteen years. The reader will find here much sound advice on points in practice, with some plain speaking on professional conduct in dealing with the public. The author tilts at humbugs conscious or unconscious, whom we have all met. We commend his advice to all young surgeons.

**THE OPHTHALMIC YEAR BOOK, VOL. XIX, FOR THE YEAR 1922. Edited by Edward Jackson and William H. Crisps, Ophthalmic Publishing Co., Chicago, 1923. Pp. 390.**

THIS book is a digest of ophthalmic literature for the year 1922. It is composed of sections, each section dealing with a particular part of the subject prefixed by a very complete bibliography.

The book admirably fulfils its object, to provide a ready reference to the latest work on any particular branch of ophthalmology.

**THE TREATMENT OF FRACTURES.—By Charles Locke Scudder, M.D., Consulting Surgeon to the Massachusetts General Hospital, formerly Assistant Professor of Surgery at the Harvard Medical School. Ninth 1923 edition, revised with 1,252 illustrations. Philadelphia and London: W. B. Saunders Company. Pp. 749. Price 42s.**

SCUDDER'S *Treatment of Fractures* is a book with an established reputation of over twenty years' standing.

More than six years having elapsed since the last edition was published, one naturally looks to see whether the great advances which were made in the treatment of fractures during the war have been accorded their due place. In this respect the book is disappointing. The author in his preface sums up the advances which have been made, but goes on to say that the new is not yet generally accepted, that some of the old is still useful, therefore he has kept it, though he recognises that much is included which is a "bit old fashioned." In a future edition he promises to eliminate everything which is only historically interesting and to confine the text to actually used methods of treatment. After this avowal, it is not surprising to find antiquated methods of treatment with flat wooden splints described and illustrated, followed by excellently illustrated descriptions of the modern methods of traction, splinting and suspension. The reader is told that the latter methods are the best, but is not given any very firm lead in the matter. Take for instance this sentence "Skin traction in fractures of the leg is coming to be recognised as rather ineffective." How ineffective it is, the author himself demonstrates in the next paragraph by quoting a series of 35 cases treated in his own hospital and examined one to ten years afterwards, in 22 of which there was some degree of permanent disability. A similar series of cases of fractured femurs treated on the old lines and examined after the same interval, gave what he himself admits are deplorably bad results, only 5 out of 21 adult cases with perfect function. Shortening not in excess of one inch is accepted as a good result. Far better results than these are obtainable nowadays and by methods which can be carried out with quite simple apparatus. Books such as this should give the lead in discarding bad methods, not wait till the better methods have been generally accepted.

We know of no other book which contains such an instructive series of reproductions or skiagrams and for this reason if for no other, we hope that Dr Scudder will give us the promised new and up-to-date edition at a very early date. The opportunity should then be taken to incorporate in a preliminary general section such subjects as selection of apparatus non-union of fractures, etc. which are now scattered up and down the book. The actual details of operative technique should be described much more fully than is done in this edition and the numerous wrong references to figures evidence of hasty revision, should be corrected.

Only if entirely rewritten on the lines we have indicated, can this book hope to retain its position in surgical literature.

**EPIDEMIOLOGY AND PUBLIC HEALTH.—A Text and Reference Book for Physicians, Medical Students and Public Health Workers. In three volumes. By Victor C. Vaughan, M.D., LL.D., Emeritus Professor of Hygiene in the University of Michigan, assisted by H. F. Vaughan and George T. Palmer. Vol. II—Nutritional Disorders, Alimentary Infections, Percutaneous Infections. St. Louis, C. V. Mosby Company, 1923. Pp. 917.**

We do not remember having noticed the first volume of this treatise, but we regard this as an omission which should be corrected as soon as possible. The publication will be completed by a third volume on venereal diseases and public health administration.

As stated in the foreword the present volume treats of the epidemiology and public health aspect of nutritional disorders, alimentary infections and percutaneous infections. It therefore includes a large number of diseases, many of which are tropical in distribution. The authors' aim has been to present a complete study of each disease in its historical and epidemiological aspects. They have had a very complete reference library at their disposal and it is evident that each subject has been carefully and completely studied. In the historical review free quotations are made from the most ancient and the most

modern treatises. The style is clear and fluent and we have read the volume, which is a fairly big one, with pleasure, interest and profit. The intensive study of disease by bacteriological methods overshadowed for a time the older science of epidemiology, the latter, however, is an older science, is more complete, has a broader and wider scope, and embraces bacteriology, which is indeed one of its hand-maidens.

The epidemiological study of Asiatic cholera for instance led to a fairly complete knowledge of the means of spread of the disease, and preventive methods based on these were successful in checking the disease long before the discovery of the specific vibrio. Similarly with enteric fever, when it was discovered early in the 19th century that the spread of the disease depends solely upon the disposition of the faecal discharges the main point in the epidemiology of the disease was solved. Bacteriology has aided greatly in making prompt recognition of disease possible and in detecting carriers.

The subjects dealt with are too numerous to note individually. It is sufficient to say that each is treated fully and the work should become a standard of reference for the epidemiologist. In kala-azar and epidemic dropsy the work of Rogers and Greig respectively forms the ground work for the text. In the chapter on malaria there is an interesting discussion on the effect of malaria on morality and national character and whether devastation and lack of cultivation may reduce or increase malaria. The review of Italian methods of prophylaxis is limited too much to the consideration of quinine prophylaxis. The question of exactly what is meant by "drainage" might have been more fully discussed. The authors are not as familiar with the work of Indian malarialogists (e.g., Christophers and Bentley) as one would have expected. With regard to rabies franker discussion of the merits and demerits of the treatment by living virus would have been welcome. Treatment with virus killed by formaldehyde and dialysis is in vogue in America but there is no mention of the Indian work on carbolised vaccine. There is an interesting note that early in the 16th century the best authorities recommended that the suspected animal should not be killed but held in safety and that if it had rabies it would surely die within ten days.

The book is very well bound and clearly printed. The misprint of an "L" for a "T" on page 430 is confusing. The description of "L" intestinalis is obviously meant for "T" (*Trichomonas*) and not *Lambia*. Kasauli is in several places referred to as Karauli. In the chapter on the dysenteries it is stated that there is no reason for concluding that there is a specific malarial dysentery. Many will we think doubt this statement.

In conclusion we thoroughly recommend the volume to all those interested in the history, epidemiology and prevention of disease.

**NOTES ON THE TREATMENT OF MALARIA WITH THE ALKALOIDS OF CINCHONA.—By William Fletcher, M.D. Camb. Bacteriologist, Institute for Medical Research, Kuala Lumpur. Published by John Bale, Sons and Danielsson, Ltd. 1923. Pp. 91.**

This book of less than a hundred pages should be read by every medical man who has to treat cases of malaria.

There should be little need for the book, for the most part it confirms and repeats the researches of other workers, in spite of this we would strongly recommend that a copy should be placed in every dispensary in India so that no medical man should be able to plead the excuse of ignorance in defence of the pernicious practices which are all too prevalent in connection with the treatment of malaria.

We are still far from finality in our knowledge of the treatment of malaria, further work on the lines of that carried out by Acton in Dagshai is badly needed. Millions of clinical observations have been made on the results of the treatment of malaria, but hardly any of



them have been carried out with sufficient accuracy to make them reliable

Dr Fletcher makes free and full reference to the important work of McGilchrist and Acton in India as well as to the findings of many other investigators. Some of his conclusions based on careful observation of his own cases are of special interest. He finds that cinchona febrifuge in doses of 10 grains twice daily is as efficient as its individual action as quinine in similar doses, but he points out that cinchona febrifuge varies greatly in its alkaloidal strength, so that results obtained with samples obtained from different sources are not comparable.

Contrary to the usual experience he found that quartan malaria is not so prone to relapse within 3 weeks after treatment as benign tertian. He found that quinine, quinidine, cinchonine and cinchonidine in 10-grain doses *bis die* appeared to be of equal value in causing disappearance of parasites, but in smaller doses cinchonidine was decidedly less potent and cinchonine somewhat less so. Quinidine was inefficient and toxic.

Of the tasteless preparations euquinine proved effective, quinine tannate was ineffective in the usual doses.

Intramuscular injections often cause serious illness and mutilation, these results are especially deplorable in those cases in which quinine by the mouth would have been equally effective. A case came under Dr Fletcher's notice in which a child was crippled for life from sciatic nerve paralysis, another in which the patient became incapacitated by ankylosis of the knee and ankles, and many cases of abscess formation with prolonged invalidism were observed. Dr Fletcher quite rightly insists that the considerable risk of such occurrences should only be run when quinine by the mouth is inapplicable and he agrees with the opinion which has been expressed by the writer of this review that most of the cases of failure of quinine by the mouth are due to the failure of the patient to take the drug, or to dishonest compounding.

Intramuscular injections are justified only in very exceptional cases, such as those who are dangerously ill, for those who are comatose or unable to swallow and for those who vomit the quinine.

Rectal administration has been found to be useless and excessively irritating. The dosage advocated by the mouth is ten grains of the sulphate twice daily for four weeks with a repetition of the course when relapse occurs. The routine examination of the urine for quinine is strongly advocated as a necessary and effective check on the proper administration of the drug.

Quinine resistance has been investigated with great thoroughness and abundant evidence is adduced to show the great rarity of the condition. Many alleged cases were kept under strict control and of many such cases only one was found to be partially resistant, that case showed a partial resistance of the parasites, but clinically the result was quite satisfactory.

It is evident that in the Malay States the same excellent results are obtained by the old-fashioned methods of quinine administration as have been obtained in India, so that, while we are waiting for the ideal method of treatment, we can continue with complete confidence to employ the old and well-tried methods.

When failure occurs the most probable explanation lies in the non-co-operation of the patient or of the compounder, not in the lack of efficiency of the drug. Far too often the inexperienced young medical man jumps to the conclusion that quinine by the mouth is useless, he should only do so when he is able to testify that the patient has actually swallowed and retained a suitable dose of the drug in a suitable form. The only point of importance which has not been stressed by Dr Fletcher is the danger of giving pills or tablets which may be insoluble or may not be absorbed.

**AIDS TO BACTERIOLOGY.**—By W. Partridge, F.I.C. Fourth, 1922, Edition. Bailliere, Tindall & Cox, London. Price 5/- net. Pp. 276.

THIS little book contains a condensed summary of the study of bacteriology. Though it cannot replace a text-book, it will certainly help the student preparing for the examination. In this edition certain new things, such as standardisation of media to hydrogen ion concentration and Jensen's method of staining have been added.

**A HANDBOOK OF SANITARY LAW.**—By B. Burnett Ham, M.D. Edited by Henry R. Kenwood, D. P. H. Ninth, 1923, Edition. London: H. K. Lewis & Co., Ltd. Pp. 244. Price 5/- net.

THIS little book is primarily intended for the use of candidates preparing for public health qualifications and probably every one who has appeared in a D P H examination has used it.

Its size is particularly handy and the printing and paper excellent. English public health law only is considered. The various subjects of law are dealt with in separate chapters and the laws relative to these clearly stated in paragraph form, the names of the Acts and the important provisions being put in heavy type. The book has been brought thoroughly up-to-date, the Milk and Dairies Act of 1922 being included, it would have been better had the orders of the Ministry of Health under the new Milk Act defining grade A, certified, and pasteurised milk been included, the latest provisions in regard to the appointment, tenure of office and salary of medical officers of health and sanitary inspectors is included in the appendix. There is a very good index.

Although the book is primarily intended for students, it will be found extremely useful to all public health workers, enabling them to find quickly the provisions of any Act in relation to a particular subject.

Every D P H student should have a copy of this useful little book, and afterwards will find it advantageous to procure the latest edition as it appears.

**DISEASES OF WOMEN.**—By H. S. Crossen, M.D. Fifth Edition. C. V. Mosby Co., St. Louis, 1922. Price \$10.00. Pp. 1,005.

THAT *Diseases of Women* by Professor H. S. Crossen, Washington, remains a valuable and popular text-book is proved by the appearance of a fifth edition, which, to meet the rapidly expanding clinical and pathological data, has been enlarged as well as revised. Its aim is primarily diagnosis and treatment as these are likely to concern the general practitioner, but in this last edition a review of theories of ætiology and accounts of pathology have been included to bring the work up-to-date.

In the arrangement of the text can be seen the experience of a practical teacher, who never loses sight of his aim to make clear the pelvic condition and the selection of the particular treatment. He wastes no time on gross anatomy and physiology, but starts straightway with a full description of examination methods, and with general remarks on diagnosis and treatment. Pelvic X-ray diagnosis has been considered at length, and though the method might be of occasional service, patients in India are not likely to submit to the ordeal of pneumo-peritoneum, nor does it seem free from the risks of driving pus from a tube into the peritoneal cavity and of causing abortion. After dealing with diseases of the external genitalia and vagina he proceeds to inflammation and nutritive disease of the uterus, its displacements and tumours, thence to general pelvic inflammation and the consideration of the adnexa tumours of the ovary and parovarium. Then follow special chapters on malformations, disturbances of function and the relation of the endocrine glands to gynecology. No space is devoted to any description of the common major operations, but the points indicating any particular operation are discussed under each disease condition and the two terminal chapters deal with recent advances in pre-operative preparation and post-operative care.

He is in agreement with modern gynecologists that chronic endometritis is of comparatively infrequent occurrence, and clears up the confusion between hyperplasia of the endometrium—a nutritive change—and chronic endometritis,—an inflammatory change due to bacterial invasion. By micro-photographs he shows the cyclic change in the histological picture of the endometrium and all gradations between a normal hyperplasia and a distinctly pathological glandular endometritis.

He deals ably with the disturbing symptom-complex of dysmenorrhœa, and his hypothesis that the underlying condition is nutritive disturbance of both ovary and uterus explains better than any other the various phenomena observed. We question, however, the wisdom of leaving in a stem pessary "for weeks and past one menstrual period."

One of the more recent and instructive chapters is contributed by Dr Ehrenfest on the relation of the endocrine gland system to gynecology. He is careful to differentiate proved facts, theory, and mere speculation, giving a fair review of the influence of the individual organs on the genital apparatus, the anomalies due to disturbed gland function, but realises that our knowledge is still too limited to state the exact mechanism of this correlation, and he is sceptical of the value of organo-therapy as practised to-day.

The author's treatment of uterine myomata is disappointing and inadequate. Myomectomy which has come recently into vogue is dismissed in a line and he fails to state completely the relative advantages of supra-vaginal and total hysterectomy. He realises the grim spectre of future malignant disease of the cervix yet shuns total hysterectomy as it means "a higher present mortality and higher morbidity." A wiser security could be attained by total hysterectomy in the first instance than by his method of removing the cervical stump per vaginam after discovering malignant change in the body of the uterus removed by the less radical operation.

His teaching on the new role of radium and X-rays in the treatment of carcinoma of the cervix is clear and valuable. The first important point is the determination of operability for the knife is still his first choice in early operable cases. He clearly shows, however, that radium and X-rays should not be regarded as antagonistic to operation but rather as complementary. For border line and advanced inoperable cases he gives a maximum dose of radium but presents it as a palliative measure with only a possibility of cure. He also advises a preliminary heavy dose of radium 7 to 10 days previous to the radical operation and then supplementary to this he employs deep X-ray therapy.

It is in the operative treatment of carcinoma of the cervix that he is neither definite nor convincing as to the relative advantages of the Wertheim or vaginal operations. He emphasises the importance of removing the parametrium intact and has no serious objection to vaginal hysterectomy if it includes this, but it is difficult to understand how this can be performed satisfactorily even by the Schanta-Schuckardt operation.

The chapter on pyosalpinx is interesting, but contains much that is controversial. We agree that it is *always* hazardous to operate in acute salpingitis and that the time to operate in chronic cases is determined by the absence or persistence of virulence of the causal organism, but surely he does not mean to preach the pusillanimous doctrine *never* to operate in chronic streptococcal pyosalpinx, though that is the logical termination of his teaching that "abdominal section for a mass of streptococcal origin is *never* safe"—perhaps he is right.

In differential diagnosis he makes the interesting generalisation that streptococcal cases are usually parametrial whilst gonococcal are usually tubo-ovarian. It is just possible, however, that he is perpetuating a fallacy of American gynecology in ascribing the great majority (80 per cent.) of pus tubes to the gonococcus the leading British gynecologists now stoutly deny that the gonococcus is so frequently to blame and our experience in India indicates *B. coli* as an important primary

ætiological factor and not merely a secondary infection as he states.

The book is well illustrated, the pictures justify the space they occupy, and the micro-photographs show clearness in detail.

Though criticism of certain passages may be easy, the book remains a good one as its principles are sound, and it must be praised as providing an adequately full, lucid and practical presentation of a difficult subject.

**CONTRACEPTION**—By Marie Stopes. London. John Bale, Sons and Danielsson, Ltd 1923. Price 12/6 net. Pp 418.

THE somewhat unsavoury subject of contraception is attracting much attention in England at present, and as it is or ought to be essentially a matter for medical men, the profession has been forced to pay attention to the question.

It is generally admitted that there are certain conditions under which contraception is desirable even essential in the interests of the life and health of the wife on the other hand it is pretty obvious that the practice of contraception will be employed wrongly and unjustifiably and by the very people who ought to bring children into the world. In India the idea of employing contraceptives is specially repugnant but even here every doctor will admit that there are occasions in which a knowledge of the subject is essential to the doctor in the interests of his patients.

The book by Dr Marie Stopes contains a great mass of information on the subject it is said to be written for the medical and legal professions though curiously enough Dr Stopes is neither a doctor nor a lawyer.

The book is of considerable value provided that the readers are clearly aware that it is not written by a medical woman and that many of the views expressed are entirely at variance from those held by competent medical men. The method which is most warmly advocated in the book is almost universally condemned by experts and one of the methods which is condemned by Dr Stopes is regarded by most medical men as the most suitable and safe. The book contains such a mass of information that it will be of considerable value to doctors it will, however, prove an unsafe guide to the layman and it is to be feared that laymen will constitute the vast majority of its readers.

**IMPOTENCY, STERILITY AND ARTIFICIAL IMPREGNATION**—By Frank P Davis, M.D. Second, 1923, Edition. St. Louis: C. V. Mosby Co. Pp 168. Price 9/- net.

THIS book deals with the subject of impotence mainly from the psychological point of view. Many interesting facts are brought forward to show the powerful influence which impressions from the sense organs, particularly olfactory stimuli exert. Several entertaining stories illustrate these remarks. A large number of drugs are recommended, many of which we notice are homœopathic preparations, from which we conclude that the book is intended mainly for this class of practitioner.

**A PRACTICAL HANDBOOK ON THE DISEASES OF CHILDREN**—By Bernard Meyers, M.D. H. K. Lewis & Co., London. Price 21/- net. Pp 548.

WE welcome a valuable addition to Lewis's Practical Series in this *Handbook on the Diseases of Children* by Dr Bernard Meyers. The range of the work is wide, and he has wisely employed the team system in its compilation. Any modern work to be up-to-date must consider the enormous advances recently made in special branches of medicine and it is equally necessary that these should be written by specialists in these branches, so we learn about "Biochemistry in Children's Disease" from one as well qualified to speak on it as Dr Mackenzie Wallis, and about the "Physiology of Digestion" from no less an authority than Sir W. M. Bayliss. "Syphilis in Children" is contributed by Lieutenant-Colonel French.

and other very practical and useful sections are on the use of sera and vaccines by Professor Eyre, Guy's Hospital, and on "Tuberculin and Laboratory Diagnosis" by Dr T Jockes, St Bartholomew's Hospital. It will be seen at a glance that the author has called to his aid the best brains of the many London teaching schools, and this is at once the work's chief merit and great defect. He is most careful in acknowledging his indebtedness and in giving credit where credit is due, but he carries this estimable virtue to the excess where it becomes a vice. It is not that the opinions of others are simply interpolated, for Dr Meyers has co-ordinated these into a homogeneous whole, but we miss the personal touch and feel too little the individuality of the writer, and would welcome more frequent clinical cases from his own twenty-one years' experience.

In the introductory chapters he deals with the physiology of digestion, breast and artificial feeding and the clinical examination of the child. In "Nutritional disturbances of Infancy" he follows Finkelstein's classification and points out that these are largely due to faulty feeding yet he does not sufficiently differentiate clinical types, nor fix them in the readers' mind by citing a few telling illustrative cases. He fails to bring out of the haze which befalls the student of these nutritional disorders a clear conception of definite clinical entities. More success attends his demonstration of how the vitamins are complementary to the various food constituents in the maintenance of nutrition and therefore of special interest in children's diseases and particularly the deficiency diseases of scurvy and rickets. The chapter on the internal secretions and the inter-action of the endocrine glands completes his picture of the child's metabolism and growth.

It is a difficult task to encompass the wide range of infantile diseases within the narrow limits of five hundred pages devoting no less than three chapters to the nervous system and chapters to special diseases of the skin, eye and ear and the infectious fevers, yet the account if not complete is none the less adequately full. With a well-balanced judgment he devotes to important conditions a few pages, while less important ones are dismissed in a paragraph. Only an author with Dr Meyer's wide reaching and vast clinical experience could be so brief without being summary, so concise without being scrappy. We can confidently recommend this handbook to the readers for whom it was written, the senior student and the busy practitioner as a sound working guide. The key stone of the book is its practicability, and in the concluding chapters the author shows, not merely by photo and description, how to give saline directly into the superior longitudinal sinus, but realises that the student must know in detail how to wash out the colon and apply a hot fomentation, if he is to instruct the conscientious mother. The work leaves an impression of sound clinical and scientific observation, logical judgment and improved methods of treatment.

**CENSUS OF INDIA, 1921, VOL III, ASSAM.—**  
By G. T. Lloyd, I.C.S. Part I, Report, 199  
plus xxxv pp. Price Rs. 4-8. Part II, Tables,  
373 pp. Price Rs. 7-8. Government Press,  
Assam, Shillong.

Mr Lloyd's report as Superintendent of Census Operations, Assam, is a most interesting, valuable and readable document. It is also of course one which is essential to medical men working in the Province. Considerations of space prevent anything like an adequate review of such a book, but it includes a wealth of information of importance. The sections are summed up in a general introduction and deal with the population of towns and villages, birthplace with the difficult question of immigration, religion, age, sex, civil condition, literacy, languages, infirmities, caste, tribes and races and occupations. The ravages of influenza and of kala-azar come out very clearly in the figures whilst the Census Superintendent agrees with the Director of Public Health as to the gross inaccuracy of vital statistics. In a total population of 7,990,246 the excess of births over deaths

for the decade should of course correspond with the actual census increase found but there is a discrepancy of over 300,000 in the figures. This is due partly to the wave of immigrants into the Province who come during the decade and some of whom die before the census is taken, thus swelling the death returns but not the population figures. mainly, however, inaccuracy is what renders the statistics so unreliable.

The immigration wave is one of Assam's most important problems. On the whole it is beneficial: the immigrants from Bihar and from Eastern Bengal raise the standard of living, bring money into the Province and competition with them rouses the indigenous inhabitant from his usual lethargy. The Nepali immigrants, however, are less welcome.

Economics are in reality of vital importance in connection with questions of public health and preventive medicine, and Mr Lloyd's general account of economic conditions among the different groups dealt with is of exceptional interest. Amongst many other interesting items in the report are accounts of tribal customs and manners, such as an account of methods of disposal of the dead, which will interest the medical man and the student of folk-lore alike.

To sum up, a most interesting and able report, written by one who has thoroughly mastered his subject.

**THE DISPENSARY ASSISTANTS' MANUAL.—**  
By Rai Hari Nath Ghose Bahadur, M.D.  
Calcutta: Dhanwantari Press. Price Rs. 7.

THIS is a very useful book written in Bengali with most of the medical terms in English, intended for the use of compounders and dressers of all hospitals and dispensaries in Bengal. It consists of two parts. Part I or the medical part is divided into eight chapters and two appendices and deals in a very clear way with all the divisions of materia medica, pharmacy, pharmacopoeial preparations, posology, tables of doses, prescription writing, and practical compounding such as preparation of aquæ, injections, infusions, decoctions, emulsions, plasters, suppositories, pessaries, pills, etc. There is a very good diagram showing the relation between the imperial and metric system. This part ends with useful hints, in cases of poisoning and two appendices containing the character, composition and uses of official remedies. Part II or the surgical part consists of seven chapters beginning with remarks on the duties of a surgical assistant or dresser. The chapters on surgical cleanliness and antiseptics are quite up-to-date. Chapter IV deals elaborately with the numerous surgical appliances, splints, drainage, etc. Then comes useful advice on the care and protection of surgical instruments, followed by a series of sections dealing with bandaging, strapping, fomentation, irrigation, injection, infusion, hyperemic treatment and application of electricity and massage. The book ends after dealing carefully with the management, including first aid, of surgical diseases or injuries, dressing of wounds, treatment of burns and scalds and useful advice for helping in an operation. The last few pages contain illustrations for proper bandaging in different parts of the body.

We can confidently recommend this book to those for whom it is intended as it contains accurate, important and up-to-date information.

## ANNUAL REPORTS.

**ANNUAL REPORT OF THE PUBLIC HEALTH COMMISSIONER WITH THE GOVERNMENT OF INDIA FOR 1921.** CALCUTTA SUPERINTENDENT, GOVERNMENT PRINTING, INDIA, 1923. PRICE Rs 3-12.

THIS report as usual is immensely important and interesting. It is a thousand pities that a popular illustrated edition is not issued for the education of the

general public. The limited use of charts and maps is doubtless due to considerations of economy such as threatened at one time to cause the complete abolition of the post of Commissioner of Public Health. Fortunately this calamity has been averted, but it is everywhere manifest that expenditure on public health is one of the first economies to be thought of by our administrators.

#### *Report on the health of the British Army in India*

During the year there was a further improvement in the health of the British troops in India, though the low water mark for deaths and sickness which existed in 1913 is still some distance away. The total average strength of the British Army in India was 58,681. The admissions for cholera were 38 for the year, the case death rate 60.5 per cent is surprisingly high in spite of the well known fact that the disease is exceptionally virulent in Europeans. Probably facilities for prompt treatment were lacking in some cases. There were only 20 deaths from fevers of the enteric group and 9 from dysentery and diarrhoea, so that there is no great room for improvement in the mortality rates for bowel infections as a whole. Considering the possibilities of infection occurring under conditions in which control is impossible, the low death rate for bowel diseases indicates a remarkably high standard of efficiency in the measures for the prevention of food and water borne infection. In the case of malaria there is a different story to tell. The admissions for this disease for the whole of India reached the high figure of 3217 per mille and was as high as 9726 for Colaba (Bombay). Delhi comes high in the list with a rate of 514.5 per mille. It is believed that prophylactic measures within cantonment limits are of little avail so long as the surrounding areas are not attended to. It is interesting to note that nearly three-fourths of the cases of malaria were diagnosed microscopically. Benign tertian infections were about four times as numerous as malignant tertians and quartan infections were extremely rare. It is curious that the cases which were regarded as relapses showed a higher proportion of malignant tertian infections than the supposed primary cases. This observation is opposed to the usual experience that benign tertian malaria is more likely to relapse than malignant tertian. Another curious point is that of 709 cases of dysentery 536 were diagnosed as protozoal in nature and only 23 as bacillary, the remainder being of doubtful nature. There were 236 cases of lobar pneumonia with 31 deaths and 99 cases of bronchopneumonia with 20 deaths.

The total death rate from all causes among the British troops—under 6 per mille in 1920 was further reduced in 1921 to 4.76—showing that the health of the soldier is very efficiently looked after.

*Indian Troops*—The average strength of the Indian troops was 216,445 for the year. There were 154 admissions and 81 deaths from cholera, nearly 10,000 cases of dysentery and diarrhoea with 67 deaths and 119 cases of "enteric" with 24 deaths. Considering that the Indian troops are under much less strict control in the matter of diet than British troops these figures are perhaps nearly as good as can be expected. There were 100 deaths from malaria and 145 from pulmonary tuberculosis. Pneumonia claimed the largest number of victims—431, and lobar pneumonia 213. The total death rate from all causes was just 10 per mille, a sad increase when compared with the 1910-1914 average of 4.40 per mille.

The death rate from respiratory diseases is obviously the most serious problem of the future both for British and Indian troops.

*General Population*—The introductory remarks in the section of the report which deals with the general population are so weighty and so interesting that we reproduce some sections of them in full—

"Sir George Newman in his report for 1921 writes 'The growth and expansion of the meaning of preventive

medicine is one of the characteristics of the present time'. Is there any real sign of such expansion and growth in India? Unfortunately the answer cannot be an emphatic affirmative: there is even evidence in some parts of retrogression.

The two main pillars of preventive medicine are the prevention of soil pollution and the limitation of the spread of contagion. The prevalence of hookworm disease which is a direct index of soil pollution, and the readiness and the facility of spread of contagion from place to place, province to province, and even to other countries show that India in respect of public health is, in comparison with other countries, living in a period considerably antecedent to 1922. It is clear that India is not applying knowledge, some of which has been gained by work within her territory, and that in India preventive medicine is not interpreted as it is in other countries. The modern definition of preventive medicine is 'The establishment and maintenance of individual health and the avoidance of infection or other conditions which bring about disease'. This definition is not accepted in India, for taking the country as a whole it is perhaps true to say that the main duty in health is held to be the provision of treatment for the sick to the practical exclusion of communal measures for the prevention of disease. So much is this the case that with the need for retrenchment since the advent of the Reforms the first thought in some areas has been the abolition or reduction of the department concerned with preventive medicine.

Why should this be? It is believed that the answer will be found by a reference to the history of public health advance in other countries, and applying the facts elicited to present conditions in India.

In Great Britain, as in all countries the two main incentives to public health reform have been fear and the spirit of humanity. Fear led at times to repressive legislation aimed mainly at the affected individual, while the stimulus often died out with lapse of memory. True humanity was permanent in its endeavour: it may have been slow in securing results but was nevertheless sure.

The pioneers of this new humanity whose names stand out in the history of Great Britain are the Wesleys, Wilberforce, John Howard and Edmund Burke. It was the spirit induced by the work of such men that led to the appointment of two Royal Commissions to consider public health in England. The first sat in 1843, when the country was threatened with cholera, and its recommendations were deferred very largely by a feeling among municipalities and other local authorities that local self-government meant local option—that is, the absence of central control.

The second Royal Commission was appointed in 1869 as a result of the representations of a Joint Committee of the British Medical and Social Science Associations. The present position occupied by Great Britain in preventive medicine is based on the action taken on the report of this Commission, among whose principal recommendations were the following—

- (i) 'The consolidation of the existing fragmentary and confused sanitary legislation'
  - (ii) 'The administration of sanitary law should be made uniform and imperative throughout the country'
  - (iii) 'All powers requisite for the health of towns and country should in every place be possessed by one responsible local authority'
  - (iv) 'The constitution of a central authority 'charged in one of its departments with the superintendence of all sanitary authorities and equipped with a sufficient staff of officers' (such authority) 'must nevertheless avoid taking to itself the actual work of local Government. We would leave direction only to the central power.
- The new department will have to keep all local authorities and their officers in the active exercise of their own legally imposed and responsible functions to make itself acquainted with any default and to remedy it: it will have also to discharge to a much greater extent its present duties, namely, to

Would that this responsibility were generally realised. The above extract brings out the point which is so often forgotten, that results from maternity and child welfare work are masked because the two main pillars of preventive medicine—a clean environment and limitation of spread of contagion—have not received sufficient attention.

#### *Schemes for Maternity and Child Welfare*

(a) *By voluntary agency*—Three all-India Voluntary Societies are at work—The Victoria Memorial Scholarship Fund, the Lady Chelmsford League for Maternity and Child Welfare, and the newly organised Indian Red Cross Society.

The Victoria Memorial Scholarship Fund deals only with the practising *dais*. During 1921 the income of Rs 85,000 was derived from a Government subsidy of Rs 46,000, and interest on investments. Grants were made to 21 centres for the training of midwives and totalled Rs 41,703. Under the auspices of the Fund certain books and pamphlets have been published and models prepared for use in classes for training *dais*.

The Lady Chelmsford League has four main objects—

(a) Education of health visitors and maternity supervisors.

(b) Propaganda by means of travelling exhibitions, publications, etc.

(c) Encouragement of formation of provincial branches.

(d) Grants to welfare centres.

A training school for health visitors has been opened at Delhi and up to the end of 1921, 26 students had passed through the School and 15 had obtained appointments.

Under propaganda literature, pamphlets and posters are prepared, a journal is published and a travelling exhibition is being prepared.

Associations affiliated with the League have been started in Madras, Rajputana and the Punjab. Further applications for affiliation have been received.

The welfare centres in Delhi and Simla to which substantial grants are made are doing excellent work and are gradually gaining the confidence of the public.

The Indian Red Cross Society has only recently been established. If it can secure a really wide membership its potentiality for good in public health generally will be almost unlimited. A promising start in child welfare work has been made in Bengal where one of the branches of the Society under a strong Committee is devoting attention to child welfare work. In co-operation with the National Indian Association a clinic has been started, and in connexion with this is a milk kitchen.

(b) *By Governmental (including municipal) agencies*—*Bombay city*—Twenty municipal nurses, all qualified midwives are at work; ten of these were appointed during 1921.

Of the confinements 568 per cent were attended by unqualified women, 51 per cent by qualified nurses other than municipal and 95 per cent by municipal nurses. 244 per cent of infants were born in hospitals. The 3 Municipal Maternity Homes providing 55 beds are becoming more popular. 1,444 women were confined in them showing an increase of 110 over the figure for 1920. Proposals for three additional maternity homes are under the consideration of the Corporation. The municipal nurses visit the homes, and during 1921 paid 35,968 such visits, and entered the homes of 61 per cent of the infants born.

An enquiry into the employment of women before and after confinement was opened under the Countess of Dufferin Fund. Nearly 31 per cent of mothers left home for work and their children to the care of others.

*Calcutta*—The city is divided into four circles, each with a staff of a health visitor and 4 midwives. Between them they attended 3,208 maternity cases, or 1 out of every 6 cases in Calcutta. Only 9 women attended by the municipal midwives died. This is a remarkable demonstration of the value of the trained midwife. 104 difficult and complicated cases of labour were treated in hospital.

Babies are visited daily for 10 days, and at least twice during the following 10 days. After this they are kept under observation for three months.

#### *Causes of Infant Mortality*

The figures for Bombay city may be taken as a general indication of the causes of infantile deaths. Out of 12,751 infantile deaths, 4,507 were due to diseases of the respiratory system, 4,395 to infantile debility, malformation and premature birth, 981 to bowel complaints, 78 to dysentery, 254 to malaria, 77 to small-pox and 66 to measles.

A considerable proportion of the deaths was therefore caused by factors which can be remedied, that is unhealthy surroundings and spread of contagion. This should be remembered, for unless they are remedied those who expect immediate and startling returns from maternity and child welfare schemes will be disappointed. In Great Britain the first drop in infantile mortality was due to the improvement of the surroundings of the homes. Organised attempts to affect this improvement should be conjoined with child welfare work proper. In England the object of the welfare centre is the supervision of the healthy child and the education of the mother. In India a third object is often found necessary as the children are so often unhealthy, and the centre tends to develop into a clinic. Education of the mother will, nevertheless, continue to be a main function of the centre, and combined with house visiting must aim at teaching the mother how to secure healthy surroundings. The centres will then be doing work of inestimable value to the country.

#### *Fevers*

More than half the deaths are included in the group 'fevers'. 4,761,237 were registered under this head against 4,931,202 in 1920 and 5,468,181 in 1919.

In Bengal and the United Provinces a large majority of fever deaths are attributed to malaria, while in Burma and Assam towns the percentages of malaria deaths to total fever deaths are 44.8 and 44.6, respectively.

A disturbing feature of the year is the increased incidence of malaria in Bombay city. The total deaths from malaria rose from a decennial mean of 264 to 545. The splenic and parasitic indices exhibited similar rises. The increased incidence was widespread. Out of 2,274 wells examined for larvae 607 were found to be breeding larvae, owing to a scanty water supply the coverings to cisterns were broken and in this way suitable breeding places were created.

The seasonal mortality for fevers yields indications which are of value. Thus there are two definite waves every year, the first between March and June and the second between September and the end of the year. The second wave is very largely malarial, but the first is certainly not malarial in every case. There is a certain amount of evidence which suggests that the first or spring wave is influenced largely by relapsing fever. Lieutenant-Colonel Gill, Chief Malaria Officer in the Punjab, has estimated from the statistics of 1920 that the deaths in the Punjab from relapsing fever in 1920 amounted to at least 26,000. Major Cragg has come to similar conclusions about the incidence of relapsing fever in the United Provinces.

The deaths recorded from relapsing fever give no indication of its prevalence. Epidemics occurred in parts of the Central Provinces, and it is possible that in some areas it is confused with influenza. Relapsing fever was unrecognized in the Madras Presidency till November 1921, when undoubted cases were found in the Remount Depot at Hosur. An epidemic occurred in the Tanjore district in March 1922.

The real cause of the spring wave will well repay investigation, especially if it be proved that it is largely due to relapsing fever. In this case such a simple measure as 'disinfection' will help in reducing sickness and death. The war necessitated the production of a cheap,

portable and simple apparatus for disinfection and a current steam disinfecter is now on the market which can be carried on a man's back or on a bicycle. An apparatus of this kind should prove invaluable in India, and after its utility and economical use has been proved in India should be in the hands of every local authority in India. The work of demonstration might well be taken up by a voluntary organization, such as the Indian Red Cross Society.

The incidence of typhus fever is unknown. It has for years been recognized in submountain districts, but how far it affects the general population is a matter of doubt. The epidemiological units referred to in the introductory remarks could in a comparatively short time provide valuable information on the incidence and distribution of these two diseases and the almost certain saving of sickness and death would more than repay the cost of maintenance.

Kala-azar is a local disease, the deaths from which have been reported as follows—

Assam	2,987
Bengal	1,552
United Provinces	168
Madras City	24

The figures for Bengal and the United Provinces are certainly gross underestimates.

In Assam kala azar work has absorbed the greater part of the energies of the Department. Eight assistant surgeons and 35 sub assistant surgeons were on special duty. Accommodation for 382 in-door patients was available. For out-patients there were 23 special dispensaries, 33 subsidiary treatment centres, and 6 Government and 43 Local Board dispensaries. The total number treated during the year was 15,880, of whom a certain number were, in the opinion of the Director of Public Health, cases of chronic malaria.

However efficient treatment may be, the disease can never be eradicated entirely thereby, so long as the chance of re-infection due to unsatisfactory surroundings exists. The Director of Public Health rightly points out that infected families should be removed from infected sites owing to the known persistence of site infection. Removal of village sites is an expensive measure, but is the only means of eradication of the disease under existing knowledge. Its expense renders its wide application impracticable. It is to be hoped that the investigation into the carrier of the disease now being carried out under the Indian Research Fund Association will be crowned with success for, until the carrier is definitely known, prevention is more or less empirical.

In Bengal the kala-azar survey continued, and 639 infected villages were found out of a total of 2,807 examined in 13 districts. The average number of cases per village was 2. The cases were mainly among men.

These facts indicate the desirability of investigating the main cause underlying the spring rise in fever mortality. It is perhaps not too much to say that although the heading fevers includes undiagnosed cases of practically all diseases connected with fever the two main diseases for India as a whole are relapsing fever and malaria. The eradication of the former is a question of disinfection and personal cleanliness of the latter efficient treatment of the sick, and anti-mosquito measures which may involve major drainage works costing large sums.

The efficient treatment of the sick is intimately connected with the demand for quinine and consequently its market price. The market price of quinine has fallen to some extent, but it is still too high to permit of more than a small percentage of sufferers from malaria receiving an amount sufficient to cure. The work under the Indian Research Fund Association of Major Sinton, M.B., on the most economical and efficient method of administering quinine is therefore of the highest importance to India and deserves the close attention of all engaged in treating malaria cases. Even should his work lead to a smaller weight of quinine per case being

used, there is no doubt that the efficient treatment of all malaria cases in India would make a serious inroad on the world's supply of quinine and tend to raise the market price. A standard treatment for India is desirable both for efficiency and economy.

The only radical method of overcoming the tendency for demand to increase the market price is for the Government of India to undertake cinchona cultivation sufficient for the needs of India. This policy has received much attention in recent years. Should the new area under cultivation in Burma prove successful there is hope of ultimate realisation. At present quinine production in India depends on areas of cinchona cultivation under the Bengal and Madras Governments, which can only supply a fraction of the present demand. There can be no question but that the provision of a cheap quinine for the needs of all India is a function of the Central Government, and it is satisfactory to note that in cinchona cultivation action has been taken. The Government of Italy has shown what can be done in malaria control by centralising the issue and manufacture of quinine products. There is considerable profit in the enterprise, and this profit in Italy is ear-marked for anti-malarial work. If this system were adopted in India the profit realised by the sale of quinine should be available for anti-malarial work over the whole of India and not be limited to those Provinces in which the cultivation of cinchona is possible.

Apart from the treatment of patients in hospitals and dispensaries the following measures were taken to bring quinine within the reach of the people—

*Bihar and Orissa*—664 lbs were sold mainly through the agency of postmasters. Owing to the high price of quinine it is proposed to substitute cinchona febrifuge.

*United Provinces*—Quinine to the value of Rs 15,057 was sold by post offices, and other officials. 209 lbs of quinine were issued for free distribution for curative treatment in malaria infected districts. Prophylactic use was limited to the police and to some schools, for this purpose 119 lbs were used. 300 lbs were supplied to travelling dispensaries.

*Punjab*—No actual figures are available but local bodies distributed a good deal free of cost.

*Central Provinces*—1,582 lbs of quinine were issued by the jail factory mainly in the form of 4 grain tablets for sale by vendors. In poorer tracts quinine was given free. The epidemic dispensaries treated many cases in districts in which malaria was very rife towards the end of the year.

*Bombay Presidency*—The sale or free distribution of quinine by district local boards, municipalities and post offices amounted to 2,949 lbs. The local Government provided Rs 49,084 for the purchase of quinine, and quinine tablets to the value of Rs 33,000 were distributed free to the general public and to school children.

*Burma*—Cinchona febrifuge was issued in place of quinine. About 3,030 lbs were used in all, of which 60 lbs were distributed free. In future the drug will be issued in the form of treatments, instead of as separate tablets.

These figures show how much yet remains to be done to make quinine readily available to the mass of the population in India.

#### Anti-Malarial Measures

In connection with anti-malarial measures it is interesting to note that there is a tendency for industrial organisations to call in the help of experts to advise as to the prevention of the disease.

Lieutenant-Colonel Christophers visited sugar estates in Kamrup and a scheme in accordance with his advice is being worked out. There is vast scope for work of this kind in India and it is disappointing to find that the measures taken in connection with the great Sarda Canal scheme are dismissed in less than four lines of the report. When the vast importance of anti-malarial measures in connection with such a work is realised it is



obvious that a magnificent opportunity for a demonstration of the value of modern methods of prevention of disease is offered and it would be interesting to know what advantage is being taken of this

The only place in which definite results are recorded is Bengal where the Jungipur flood and flush scheme is reported to have reduced the spleen index and to have been attended by a considerable improvement in the general mortality

On the whole the measures which have been taken to cope with the most important disease of India are disappointing, and we fear that they would not receive the commendation of the father of malaria prevention—Sir Ronald Ross

The death rate for respiratory diseases is obviously greatly understated for India as a whole, it is only in the great cities that any appreciable mortality is reported, and it is clear that much of the mortality for respiratory disease is included in the heading "fevers"

#### *Cholera*

The number of deaths registered from cholera, came to 450,608, giving a death rate of 187 per mille. It was a bad year for North-West and Central India, and the North-West Frontier Province, Punjab, the United Provinces, Central Provinces and Delhi suffered very severely

Cholera is another disease which has not yet been tackled seriously in India. We read of the curtailment of the organisations which had already been formed owing to "financial stringency" and it looks as if the potentially most productive industry in India—preventive medicine—were being strangled by false and short sighted economy

Dysentery and diarrhoea are said to be responsible for over two million deaths, an estimate which is probably much below the actual mark. Small-pox is the one disease which has been dealt with in a reasonably thorough manner in India with the result that the deaths amount to the trifling figure of 40,446. This figure is nothing to boast of but it constitutes a mere fraction of the death rate which would certainly occur if vaccination had not been adopted and persevered in as a means of controlling the disease

#### *Plague*

The year witnessed another great reduction in the incidence of plague. Only 69,682 deaths were reported in British India and 11,839 in Indian States making a total of 81,521. The mean mortality calculated on 20 years is 500,000 approximately. In 1920, 140,259 deaths were registered. These figures must not produce too sanguine a spirit. The reduction is not due to preventive measures entirely, but perhaps mainly to natural causes such as unfavourable climatic conditions, scarcity of food and perhaps a growing immunity among rats. The increasing death rate in towns, for instance in Bombay city the deaths numbered 807 against 281 in 1920, and the existence of a larger number of infected foci towards the end of 1921 indicate the possibility of enhanced mortality in 1922-23, provided climatic and agricultural conditions are not unfavourable. This possibility renders the abandonment of certain experimental investigations by reason of financial stress all the more regrettable. These experiments will be referred to later

Plague, which has killed over 10 million people during its present visitation, will undoubtedly disappear as it has always done in the past. There are indications, however, that it will cause a great many more deaths before it departs. What is to be done? Obviously the only radical cure for plague is the improvement of housing and methods of storing grain, so that rats and man will not live in intimate association and rats will not have free access to grain

Town improvement is a radical measure, but slow and costly. Large sums of money have been spent on many cities, but much remains to be done before any of them can be considered proof against human plague. Town

improvement schemes should be pushed with such vigour as money permits, for they will ultimately influence materially the incidence of plague. In addition attention to improvements in grain storage and the destruction of rats must be given. There has been a great demand for copies of the note by Dr Chitre on improved methods of rat destruction and of the plan for a rat free-godown designed by Major Norman White. This demand has been met and it is to be hoped that some advance may result. Some say that rat destruction is expensive and unprofitable for it has to be continuous. This is partly true but it has not to be continuous throughout the country. The special operations in Belgaum and Dharwar districts tend to show that intensive operations in specially dangerous towns and villages for a portion of the year may ward off an epidemic. It is well to remember that the cost of killing a rat does not compare with the price of the food of a live rat

#### *Ankylostomiasis*

*Bengal*—The special investigation was discontinued in March. The results obtained are tabulated—

Area	Percentage of infection
Burdwan Town	31.3
Burdwan rural area	53.6
Police	61.3
Prisoners	68.06
Mills and factories	74.3
Tea gardens and coal areas	78.3

*Madras*—A detailed enquiry under the Indian Research Fund Association has revealed the following figures—

#### 1. Districts—

(a) Wet cultivation, 96 to 100 per cent infected

(b) Dry cultivation, 66 to 83 per cent infected

2. Schools, 55 to 87 per cent infected

3. Jails, 89 to 97 per cent infected

4. Industrial population, 91 to 94 per cent infected

5. Tea Estates, 100 per cent infected

Instructions for conducting a campaign against the disease will be issued by the Provincial Public Health Department shortly

*Central Provinces*—An investigation among prisoners indicated a percentage of 31 infected

During 1921 the employees at the Empress Mills, Nagpur, were examined and 10.59 per cent were found to be infected. The sanitary arrangements at the Mills are described as very good

*Burma*—Work in the jails was continued during the year and a percentage rate of infection of 67.43 was found

The enquiry by the Indian Research Fund Association is still proceeding and it is hoped that a concise report, including the use of carbon tetrachloride in treatment will soon be available for distribution. Detailed reports have been published in the *Indian Journal of Medical Research*. Much more definite information regarding the incidence of infection over India generally is required, even if this information at first only results in efficient treatment of some of the sufferers. Although eradication of the disease depends on the limitation or control of soil contamination, much can be done to limit the special contamination of the soil by mass treatment. The work under the Indian Research Fund Association will enable this to be done in those areas for which the money can be found. If only the educated portion of the community could realise that the indiscriminate soil contamination which is practically universal in India, results in an incalculable amount of sickness, and a large number of preventable deaths every year some real advance in this fundamental principle of public health and cleanliness would result

#### *Leprosy*

Accommodation for about 5,000 lepers is available

In Bengal consideration is being given to the construction of a Leper Colony for 1,000 patients

# A Rapid Restorative



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Bovril is a food as well as a stimulant. When taken regularly over measured periods, Bovril has been found to possess body-building powers of a very special and remarkable character.

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Dhanbad, which returned one of only 60 returned statistics which are obviously inaccurate. In 57 municipal towns where registration is compulsory the accuracy of registration of 25,935 vital occurrences was investigated, 2,202 omissions were found, 312 prosecutions were instituted and no less than 207 convictions obtained. In brief, writes Colonel Ross, vital statistics are the barometer for public health work in a province, and accuracy in such matters is as important to the public health official as accuracy in his compass to a ship's master at sea. Further, such figures go hand and hand with the economic state of the population concerned, "if public health is to improve, progress and effort are essential, and these imply organisation, the spread of knowledge, and expenditure. *The expenditure is the immediate difficulty which has been allowed to dominate the situation too long. It appears to create a vicious circle the people are poor because they are not healthy, and they are unhealthy because they are poor they cannot afford to pay to acquire public health, therefore nothing can be done.*" We have rarely seen the real situation put more forcibly.

"This is where public health becomes an economic question," he continues. "Let us not look on the difficulties and not be disheartened by the apparent impossibilities. Let us rather accept the proposition that public health is an economic question and must be dealt with accordingly. Let us admit that we *must* have the funds to meet the expenditure which we know must be incurred if we are to make any real progress, and let us consider how we may obtain these funds, rather than waste time in tinkering with the health of the people." A statement of the facts with which every public health worker in India will agree.

Of special diseases in the province, cholera is ever of importance, especially in connection with the annual Puri festival. The annual cholera rate fell from 2.6 in 1921 to 0.7 in 1922. Special preventive measures were taken and special staff employed at the Puri festival and at Sonapur Fair. A special epidemic cadre of 10 sub-assistant surgeons has been sanctioned in this connection, but it was found impossible to recruit this strength, and 6 assistant surgeons had to be employed to make good the deficiency. These officers were established at Patna as headquarters and were sent out throughout the province to any place where an epidemic threatened,—a foreshadowing of the scheme for the establishment of special epidemic units throughout India, which was formerly decided upon at Simla, but which the recommendations of the Inchcape Commission rendered impossible. A special epidemic reserve of 100 vaccinator was also entertained from April to September for cholera or other epidemic duty.

Cholera tends to become epidemic in Bihar and Orissa between March and October,—the average annual mortality being no less than one lakh of lives. Climatic conditions are especially suitable for its spread and density of population, especially in Bihar, renders its spread rapid. It can be shown that the rapidity of spread of such an epidemic disease is of the nature of the formula  $N^2-N$ , so that if  $N$  be unity there is no spread whereas if  $N$  be any high figure, the spread is almost in proportion to the square of the number of cases present at any given moment. Whilst segregation, inoculation and the chlorination of water supplies are all valuable

question of fly transmission should promptness in reporting cases, in when it first appears, and in assembling staff needed for an anti-cholera campaign most essential.

important during the year, but it is as shewed a falling off, as compared with 1921. The death rate from fevers as compared with 22.6 in 1921, in a healthy and prosperous one, fever cases were at a minimum. On a chart of fever incidence shewed an a maximal rise in May, very due to malaria. Influenza may be

practically discounted, and special steps were taken to investigate whether relapsing fever was responsible, the results were negative. Further investigation of this question is called for.

Malaria and hookworm constitute the two most important problems of the province, and Colonel Ross notes that, in the first place, he considers that quinine prophylaxis on a large scale would be practically useless in connection with the former disease. Large engineering works and extensive drainage operations are out of the question, owing to scantiness of funds. What is wanted is an anti-malarial policy which will pay its own way. Such a policy is possible, indeed it is already being carried out in Italy and Spain. It consists of combining agricultural improvement with sanitation, by draining or flooding marsh lands in such a way as to produce larger crops and at the same time reduce anopheline breeding. (And—if any further illustration be needed—we may point to the examples of Algiers, which by intensive agricultural cultivation has of recent years been converted from a malaria-ridden country to one which is now a health resort, and—on the other hand—to Corsica, where, with extensive de-forestation and a policy of *laissez-faire*, a previously healthy coastal belt has now become a malaria-ridden haunt.)

Plague was of very minor importance during the year, but Colonel Ross notes on the good effects of the voluntary evacuation of infected houses combined with inoculation. Both respiratory diseases and dysentery and diarrhoea also shewed a marked decline in incidence. With regard to ankylostomiasis, it is noted that investigations at the Patna Lunatic Asylum and in the Central Jails at Bhagalpur and Buxar shew an infestation of from 50 to 70 per cent, and that successful treatment is only one aspect of the problem,—the provision of suitable latrine accommodation being equally important.

With regard to propaganda work, considerable advances have been made. The three Assistant Directors of Public Health and the officer in charge of the Public Health Bureau gave lantern lectures, and 192 such lectures were delivered during the year in towns and villages. The twelve most important towns of the province had previously been provided with health officers but municipalities in general seem unprepared to pay for their services, and the number employed during the year fell to six. (It appears that municipalities in general will not pay for expert advice, but prefer to crawl along on the well-established line of petitioning Government for everything, for funds for water supplies and drainage schemes, for the services of public health experts, for remission of taxation, in a word they fail entirely to realise either their own responsibilities or their opportunities. Devolution may be the order of the day in India, but devolution of public health matters from Provincial authorities on to municipal boards means still further devolution on to their conservancy personnel, who are scarcely sufficiently educated to realise the importance of the problems involved.)

The six school medical officers inspected 172 schools and delivered 1,279 lectures. Dr J. L. Das, in charge of the Public Health Bureau, delivered 30 lantern lectures and issued numerous pamphlets and press articles. Dr G. W. Thompson, Medical Officer of Health, Jharia Mines Board of Health, reports steady and continuous improvement in sanitary conditions in the mining areas, and especially the extension of the use of aqua privies.

"Sanitary progress," writes Colonel Ross, "is, as it has always been, slow and disappointing. It is not ignorance but inertia which is the real cause of such slow progress. People do not recognise that the improvement of public health is a paying proposition,—that wise expenditure brings in a great return. Health, like any other commodity, is purchasable, and in accordance with the economic law, one can only obtain the quantity and quality for which one is prepared to pay." And he goes on to emphasise that three essential factors are requisite for any further progress—(a) economic progress to produce the means to meet the necessary expenditure, (b) education of the public as

to the value of sanitary and public health measures, and (c) legislation, to control and direct local administration in public health matters and to provide legal sanction for enforcing public health law

We have rarely seen the real problems of public health work in India better expressed. To legislators in a frenzy of economy it may seem that economy may be readily effected by reducing public health grants. The wiser policy,—were anyone aware of it,—would be to broaden the basis of taxation so as to meet such beneficial expenditure

## Correspondence

### INSULIN IN THE TROPICS

To the Editor, 'THE INDIAN MEDICAL GAZETTE'

SIR—Since writing, with Dr Douglas, the article on deterioration of insulin which appeared in the January number of the *Gazette* I have had the opportunity of testing further samples. Those stored in India have all been found much below the original standard, but a special consignment sent direct from London to Rangoon in cold storage and placed in cold storage on arrival was found to be of the full original potency.

Three units of this consignment produced the required lowering of the blood sugar in a rabbit of 1,000 grammes and convulsions in 2 hours.

Certain irregularities have been found in testing the insulin on rabbits and any rabbit with a high glycogen reserve is unsuitable for the purpose. I now select rabbits which are somewhat thin and weigh as nearly as possible 1,000 grammes and whose blood sugar after 24 hours' starvation is not over 0.12 per cent. With rabbits starved for 24 hours and their blood sugar not estimated before injection of insulin, I have found that some among the series will remain unaffected by several times the dose which will produce convulsions in others. The intravenous route is always selected for injection of insulin in tests and the blood for sugar estimation taken by heart puncture with a tuberculin syringe. It is satisfactory to know that import in cold storage will result in retention of potency, and the study of the further results of storage under different conditions in India will put us in a position to obtain the best results—Yours etc

J TAYLOR,  
Major I.M.S.

PASTEUR INSTITUTE,  
RANGOON  
15th January 1924

To the Editor, 'THE INDIAN MEDICAL GAZETTE'

SIR—An editorial note affixed to page 583 of your December issue states that information has been received that many samples of insulin which are on the market are seriously defective, and that an important note on the subject has been crowded out of the current issue of the *Indian Medical Gazette*.

As no brand or make of insulin has been specified in the paragraph referred to above, the inference is that all brands of insulin are suspect, and until fuller particulars are published, physicians in India will naturally hesitate to employ any.

We take this opportunity to inform you that we have only this week received a report from our London laboratories to the effect that tests recently made show that

'Wellcome' brand insulin will withstand temperatures much higher than those to which it would be subjected in India even during the hot season without appreciable reduction in therapeutic activity. Prof MacLeod of Toronto is reported to have said that insulin supplied by the picrate process, which is that employed in making

'Wellcome' brand insulin, can even be boiled without destroying its efficacy.

The first supplies of 'Wellcome' brand insulin received at this office arrived on the 18th October, from which date it has been stored in a refrigerator at a constant temperature of 60 Fahrenheit. These facts would indicate that the specimens of insulin which are alleged to be 'seriously defective' cannot have been 'Wellcome' brand products, and we beg that you will make that point clear in the next issue of the *Gazette*.

We take the liberty to send you herewith two specimen tubes taken at random from the first shipment of insulin which we have received and we shall be obliged if you will subject them to clinical test.

The home demand for 'Wellcome' brand insulin was so great up to last September that it was not found possible to issue any of the product to India. Plentiful supplies are now available for export and we have no reason to believe that this product will deteriorate provided ordinary care is taken in storing it.—Yours, etc.,

BURROUGHS WELLCOME & CO

BOMBAY

18th December 1923

[NOTE—These samples were made over to Dr J P Bose, Diabetes Research Scholar, Calcutta School of Tropical Medicine, upon receipt for test. His report will be found upon page 132 of this issue.—EDITOR I.M.G.]

To the Editor, 'THE INDIAN MEDICAL GAZETTE'

SIR—We have pleasure in enclosing herewith copy of letter received this mail from The British Drug Houses, Ltd, London, giving further particulars as to the testing of insulin returned from India, and we trust that this will be found of sufficient interest to you to ensure its publication in your next issue—Yours, etc

SMITH, STANISTREET & CO, LTD

9 DALHOUSIE SQUARE,

CALCUTTA

22nd January 1924

To the Editor, 'THE INDIAN MEDICAL GAZETTE'

SIR—Our Mr Grimshaw has reported to us the tests of "A B" insulin, Batch No 243, which you carried out early in December. We greatly appreciate the trouble you have taken in testing it and your kindness in allowing Mr Grimshaw to witness the test.

He has returned to us two bottles of this batch, and we have had the contents of one of the bottles re-tested employing the half-empty bottle, as we consider that this would be the most stringent test possible.

We found that 0.25 c.c. (or 5 units) reduced the blood sugar of a 2-kilogramme rabbit from 0.1 to 0.043 per cent, 0.5 c.c. (or 10 units) reduced the blood sugar from 0.11 to 0.041 per cent, giving severe convulsions, and 0.625 c.c. (or 13.5 units) reduced the blood sugar from 0.11 to 0.043 per cent., giving such very severe convulsions that the life of the rabbit was with difficulty saved.

This result corresponds so closely with our tests of this particular batch before it was issued that we are satisfied that there has not been the slightest loss of activity, in spite of the fact that the insulin was sent out without any precautions as to cold storage during its journey to and from India nor, so far as we know, whilst it was in India, therefore in some 2½ months of tropical conditions it has undergone no change.

We would point out that this batch was one of the last issued of the old standard of activity, and that the insulin issued by us since then has all been approximately 50 per cent stronger than this.

We are greatly impressed with the fact which this and other reports from India seem to indicate, that the rabbit test carried out there does not compare directly with the rabbit test carried out in this country, and it would seem

a possible explanation that there is some difference in the reaction of the rabbits due to different climatic conditions or to the character of the food given to them. It is conceivable that these differences cause the liver of the Indian rabbit to possess a greater store of glycogen. We presume that there is no reason to suppose the difference to be due to the strain or breed of rabbit.

Apart from the above, we have very carefully and repeatedly re-tested our "A B" insulin after storage under different conditions, and have not so far been able to observe any detectable loss of activity after many months.

In view of the set-back which insulin treatment has suffered in India through the publication of adverse reports on the keeping properties of insulin solution, we trust that in the public interest you will see fit to give full publicity to the statement contained in this letter, in your valuable journal, so that the benefits of insulin treatment may not unnecessarily be withheld from those suffering from diabetes—Yours, etc

THE BRITISH DRUG HOUSES, LTD

16-30, GRAHAM STREET  
CITY ROAD LONDON, N 1  
3rd January 1924

[NOTE—The original No 243 batch, which was kindly submitted to us by Mr Grimshaw, was tested in his presence by Dr J P Bose, Diabetes Research Scholar, Calcutta School of Tropical Medicine, whose report will be found on page 132 of this issue. The above letter is a reply to this report.

We have shewn the above letter to Dr Bose, who remarks—

(1) That it would appear from the letter that the maximum reduction of blood sugar came to much the same, viz, down to 0.041 to 0.043 per cent whether 5, 10 or 135 units of insulin were used.

(2) It would further appear that the reduction of blood sugar did not vary very much in spite of the increase in dosage. The reduction with 10 units was apparently slightly greater than with 5 or with 135 units.

(3) Although the blood sugar percentage came down to what is generally considered as being below the "convulsion level" in all three rabbits, only two went into convulsions. The dose given to the second rabbit, 10 units, is approximately  $3\frac{1}{2}$  times what should be a fatal dose for the rabbit, and—although convulsions ensued—the reduction in blood sugar was 63 per cent of the sugar content of the blood or just below the theoretical reduction of 70 per cent for a convulsant dose.

It would appear that either (a) the rabbit test is unsuitable under Indian conditions, or (b) that there may be some factor present causing deterioration, and that—as will be seen from Dr Bose's findings with insulin sent out in cold storage, on page 132 of this issue—such factor is not necessarily exposure to heat. The whole subject clearly requires further and thorough investigation. In the meantime, in view of the undoubted therapeutic success in clinical practice with insulin in India, and of the results recorded by Major Taylor with insulin sent out in cold storage, it would appear advisable at least to use only insulin which has been sent out in cold storage and kept in cold storage since arrival in India. The letters from the manufacturers are clearly justified in view of the extreme importance of the preparation in medical practice in India, and we would welcome any further and authoritative information on the subject—Editor *I M G*]

#### THE INDIAN MEDICAL YEAR, 1923 A CORRECTION

To the Editor, "THE INDIAN MEDICAL GAZETTE"  
SIR,—Re your article in the January number of the *I M G* entitled "The Indian Medical Year, 1923" you made a kindly reference to my article regarding the influence of altitude in malaria. Unfortunately by a clerical error you have represented me as saying that in

July and August the humidity (in Murree) is unfavourable whereas my whole point (as the chart and letter press clearly show) was that in these months and in these months alone the temperature and humidity are both favourable to transmission.

The error is obviously clerical and is readily understood in view of the wide range of reading which the preparation of your article entailed. If you could see your way to correct the mistake I should be obliged, for more people will read the *I M G* than the original paper—Yours, etc,

C A GILL,  
Lieut-Colonel, *I M S*

LAHORE, PUNJAB  
22nd January 1924

#### A SENSITIZED ANTI-PLAGUE VACCINE To the Editor, "THE INDIAN MEDICAL GAZETTE"

SIR—With reference to my offer to supply sensitized anti-plague vaccine which appeared in the December issue of the *Indian Medical Gazette* I much regret I can no longer keep the offer open. I must apologise to those officers whose letters I have not yet had time to answer, and also to those whom I have kept waiting for the vaccine. I will supply all who have already applied to me as soon as I can, but I cannot undertake to send out any more after February 15th—Yours, etc,

C I STOCKER,  
Major, *I M S*

2, RESIDENCY ROAD  
PESHAWAR  
7th 12th February 1924

## Service Notes.

### OBITUARY.

#### THE LATE RAI BAHADUR HIRA LAL

The death of the late Rai Bahadur Hira Lal on the 14th of October, 1923, removes one of the best known and brilliant of Indian surgeons in the Punjab. Born in 1873 at Amritsar, he qualified from the Lahore Medical College in 1891, and his subsequent career was closely bound up with that college. He held in turn the appointments of House Surgeon to the Mayo Hospital, Demonstrator in Anatomy, Lecturer in Medicine and Materia Medica and Lecturer in Surgery at the Medical College. Much of his genius for surgical work and professional ability was learnt under Colonel F F Perry, *I M S*, and he stood perhaps first among his compeers in the province in both general and ophthalmic surgery. During the war he acted as Honorary Surgeon to the Mayo Hospital, Lahore. As a surgeon he was accurate and bold whilst he always upheld the dignity of his profession.

In addition to his professional duties, his interests covered a wide scope of useful service in connection with social welfare and the improvement of medical education in the Punjab. In 1922, during Sir Norman Walker's visit to India, he was associated with the enquiry into the midwifery teaching in the Indian medical schools, and was one of the pioneers for the scheme for establishing a fully equipped maternity hospital at Lahore for teaching purposes.

Rai Bahadur Hira Lal will be missed by many friends and colleagues and by the numerous students whom he did so much to help. He leaves behind him six sons the eldest of whom is Capt S L Bhatia M.C., I.M.S. Professor of Physiology and Hygiene at the Grant Medical College Bombay.

#### APPOINTMENTS AND TRANSFERS

LIEUT.-COL. J K S FLEMING O.B.E. I.M.S. Offg Deputy Director-General Indian Medical Service, is appointed to hold charge of the duties of Public Health Commissioner with the Government of India, in addition to his own, with effect from the 28th December 1923 and until further order.

Lieut.-Colonel T H Simons, O.B.E. I.M.S. Offg Surgeon-General with the Government of Madras, is confirmed in that appointment with effect from the afternoon of the 9th January 1924.

Lieut.-Colonel W W Jeurwine, C.M.G. M.D. I.M.S. Civil Surgeon, Simla West is appointed to hold charge of the duties of the Civil Surgeon Simla East in addition to his own during the absence on leave of Lieut.-Colonel F W Summer, M.D. F.R.C.S.E. I.M.S.

The services of Major T D Murison I.M.S. are placed temporarily at the disposal of the Government of Assam, with effect from the 26th November 1923.

The services of the following officers of the Indian Medical Service are placed temporarily at the disposal of the Government of the Punjab from the dates on which they assume charge of their respective duties —

Captain S Gordon M.C. I.M.S.

Captain H Chand, M.C. I.M.S.

Captain N D Puri M.B. I.M.S.

#### LEAVE.

LIEUT.-COLONEL F H G HUTCHINSON C.I.F. I.M.S. Public Health Commissioner with the Government of India is granted leave for eight months with effect from the 28th December 1923.

Lieut.-Colonel E E Waters I.M.S. Surgeon Superintendent Presidency General Hospital Calcutta is allowed leave for twelve days with effect from the 14th October 1923 in extension of the leave granted to him.

Lieut.-Colonel F W Summer, M.D. F.R.C.S.E. I.M.S. Civil Surgeon Simla East is granted leave for four months with effect from the afternoon of the 25th October 1923.

Major J Morison I.M.S. Assistant Director Bombay, Bacteriological Laboratory, is granted leave for 8 months with effect from the 15th April 1924 or the subsequent date on which he avails himself of it.

#### RETIREMENT

COLONEL W G PRIDMORE C.M.G. M.B. I.M.S.

#### RESIGNATION

CAPT B F BEATSON I.M.S. 7th November, 1923

#### PROMOTIONS

##### Lieutenant-Colonel to be Colonel

Archibald Nicol Fleming D.S.O. M.B. F.R.C.S.E. (vice Colonel Charles Harford Bowle-Evans, C.M.G. C.B.E. M.B. promoted to the rank of Major-General, with effect from the 6th September 1923. Colonel Fleming's tenure of appointment will reckon from the 3rd December 1923.

The promotion to his present rank of Major R A Chambers O.B.E. M.D. notified in Army Department, Notification No 2313 dated the 4th October 1918 is antedated from 1st September 1918 to 1st March 1918.

##### To be temporary Major

Captain (now Major) G R. Lynn, D.S.O. M.B., I.M.S. to be temporary Major whilst employed as Deputy

Assistant Director of Medical Services with the Egyptian Expeditionary Force, from the 16th May 1918 to 30th July 1921.

##### To be temporary Captain

Dwarka Prasad Bhargava. Dated 16th August 1923

##### To be temporary Lieutenants

Muneeb-ud-Din Minhas Dated 29th November 1923

Asa Nand Narang Dated 1st December 1923

Lachhman Das Khatri Dated 7th December 1923

A War Memorial for the Sub-Assistant Surgeons of the Madras Presidency who fell during the Great War has been subscribed for and an obelisk is nearing completion. The Memorial Committee has decided to carve on the obelisk the names of the Sub-Assistant Surgeons who died in the Great War. So far it has been possible to collect the names of the following Sub-Assistant Surgeons. Any additions or corrections regarding these names will be very thankfully received by the Committee. All communications should be addressed to the Honorary Secretary, War Memorial Committee, Royapuram Medical School, Madras.

- 1 R Krishna Singh
- 2 Farid Khan
- 3 K. Sukumaran
- 4 Capt K Harihara Bhat, I.M.S.
- 5 C M Tholasy
- 6 H Papanna Naidu
- 7 V Sambasiva Naicker
- 8 M Narayana Nair
- 9 Shrick Shrick Farid
- 10 Sied Sulaiman
- 11 David Pillay
- 12 Udankelu
- 13 Narayanaswamy Swaminathan
- 14 G Appala Narasimhulu Naidu
- 15 M R Timothy
- 16 T C Ramaswamy Sarma

Hon Secretary,  
War Memorial Committee  
Royapuram Medical School

MADRAS

2nd February, 1924

## NOTICES.

### THE SUNC X-RAY COMBINATION

MESSRS WATSON AND SONS Sunc House, Parker Street, Kingsway, London, W.C.2, have recently issued their bulletin No 565 dealing with this apparatus. It comprises the following instruments assembled into one unit —

A horizontal couch on which screening is carried out and exposures made.

A vertical stand for the same purposes with the patent standing

A high-tension transformer for directly operating the Radiator type of Coolidge x-ray tube.

The whole is so designed as to fit into a small space and be suitable for the consulting room, the actual floor space required being only 9 feet by 3 feet 6 inches.

The transformer has an output of 64,000 R.M.S. volts at 30 milliamperes continuously and also provides by means of a special winding, the low voltage current necessary for heating the cathodic spiral of the Coolidge tube. When the transformer is operated from alternating current mains the outfit is noiseless except for a faint hum. With direct current supplies a small rotary converter is required. There is an entire absence of moving and fragile accessories and all high-tension wiring is insulated and protected. All parts are fitted.

The complete combination for alternating current is listed at £285 or for continuous current at £340. The

brochure also contains a complete price list of accessories and photographic accessories

### THE HILGER INDUSTRIAL, MEDICAL AND STUDENTS' POLARIMETER

Messrs ADAM HILGER 75 (a) Camden Road, London, N W 1 bring to our notice a new and useful polarimeter specially designed for any class of work which does not demand a greater accuracy in angular rotation than 0.05 of a degree. When used for sugar estimations this corresponds with 0.035 grammes of sugar in 100 c.c. measured in a 2 decimetre tube. The scale is divided to read by vernier to 0.05 degree. The main aluminium body is extremely rigid and carries the analyzer, polariser and reading glasses. The splash glasses are set well back and are mounted upon cylinders inserted in the side of the main body and easily removable, thus making renewal and cleaning very rapid operations. No window fittings project into the trough, so that the corrosion so likely to occur at such places is avoided.

### THE MEDICAL "WHO'S WHO"

THE Grafton Publishing Co., Chichester House, Chancery Lane, London, W C 2, have forwarded to us an advance notice of an interesting forthcoming publication with the above title. Originally begun in 1912 as a small volume of 300 pages, it grew to a substantial volume under its late editor, but publication was suspended on his death in 1918. The new edition aims at blending all the good features of the *Medical Directory* with those of the well-known "*Who's Who*" and such a scheme should produce a very attractive and useful volume. The editor calls the attention of registered English medical practitioners residing in India to the importance to themselves of returning the forms which they will shortly receive in connection with this volume. Many officers of the I M S, he notes, have sent in no reply to previous circulars and have furnished no particulars.

The work is recognised by the General Medical Council, which has furnished considerable help in its preparation, and the cover of the volume will be, by permission of the Council, a replica of that of the *Medical Register*.

### VALENTINE'S MEAT JUICE

VALENTINE'S meat juice is so well known that but little, except appreciation, of it is needed in our columns. It has been a favourite form of nourishment for patients with medical practitioners of at least two generations. In chronic intestinal ailments it presents a most excellent form of nutrition in simple exhaustion—especially if taken with hot water—it restores vitality and energy in all wasting conditions, and especially in phthisis, it is of very considerable value. In the tropics, however, perhaps its chief value is in acute gastric and intestinal disorders where, when given iced and cold in teaspoonful doses, it is often about the only form of nourishment that the patient will tolerate. Its use in convalescence after acute febrile diseases also renders it a most valuable preparation to the medical practitioner in the tropics.

### LEITZ MICROSCOPES

We have received with much pleasure from Messrs Ogilvy and Co. 18, Bloomsbury Square, London, W C 1, copies of two new Leitz catalogues, Nos 47A and 47C. The former is a catalogue of microscopes and contains many most interesting models. Thus the well known Leitz D model which is in every way suitable for ordinary bacteriological work, is listed (with mechanical stage) at £31-5-0 whilst the new and sumptuous AABM model, with interchangeable monocular and binocular tubes, and with four objectives is priced at £58. This new and very perfect model, which we have

seen and used, represents the latest word in clear definition and comfort in working.

The second catalogue, No 47C, deals with dissecting and simple lens microscopes and magnifiers. The dissecting microscopes illustrated vary from the simple students' model, No 208, which works out at £3-15-6 with two aplanatic lenses, to the luxurious Greenough stereo-binocular at £14-5-0 without lenses. A very attractive instrument is the electric binocular head lamp with stereo combination, the price for the complete outfit being £14. This should give the nose, throat and ear specialist exactly what he requires for perfect examination and work. Leitz's fluorite objectives are very suitable for work in the tropics, and we note that their 1 1/12th inch oil immersion fluorite lens, with a numerical aperture of 1.32 is priced at £8-9-0 as against £11-8-0 for the similar apochromatic lens. The fluorite 1 1/10th inch immersion lens at £5-17-0 with a high ocular gives sufficient magnification for all ordinary laboratory work, and very good definition.

Both catalogues are worth the study and attention of all laboratory workers.

### AGOTAN IN RHEUMATOID CONDITIONS

THIS remedy has aroused considerable attention recently in the medical world on account of its powerful action as an eliminant of uric acid.

Weintraud found that in gouty patients on a purine-free diet it more than doubled the quantity of uric acid excreted in the urine.

Chase and Fine found that in gouty cases the uric acid in the blood was reduced from 4 to 6 milligrammes per 100 grammes of blood to 2 milligrammes.

A single dose of 30 to 40 grains taken by a healthy man increases his uric acid excretion threefold without altering metabolism. It acts on the kidneys and influences the renal cells in such a way that uric acid passes much more easily than before. It is, therefore, a specific for gout, rheumatism, arthritis, etc., whilst it is of considerable value in the treatment of dengue.

Agotan is non-poisonous and the makers claim that apart from its function as an eliminant of uric acid, agotan will do anything that aspirin does and a great deal more. It will, for instance, often relieve severe headache, neuralgia, neuritis etc. when aspirin fails to do so.

Agotan is put up in 7 1/2 grain tablets. The makers are Messrs Howards and Sons, Ltd. Ilford, London, England.

## Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints of the literary pages of the "*Gazette*" gratis, if asked for at the time of submitting their manuscripts.

Reprints of the article concerned (only) in place of reprints of the whole of the literary matter of the issue can be supplied on payment.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR *The Indian Medical Gazette* c/o Messrs Thacker, Spink & Co., P O Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs Thacker, Spink & Co., P O Box 54, Calcutta.

Annual Subscription to "*The Indian Medical Gazette*" Rs 16 including postage, in India Rs 18 including postage, abroad.

HOWARDS'  
PHENYL CINCHONINIC ACID  
**AGOTAN** BRAND

definitely

**ELIMINATES URIC ACID**

and is therefore a specific for

**GOUT, RHEUMATISM, ARTHRITIS, Etc.**

Weintraud found that in gouty patients on a purine-free diet it more than doubled the quantity of uric acid excreted in the urine

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A single dose of 30 to 40 grains taken by a healthy man increases his uric acid excretion threefold without altering metabolism. It acts on the kidneys and influences the renal cells in such a way that uric acid passes much more easily than before

AGOTAN is non-poisonous, and an eminent Professor states that, apart from its function as an eliminant of uric acid, Agotan will do anything that Aspirin does and a great deal more. It will, for instance, often relieve

**SEVERE HEADACHE, NEURALGIA, NEURITIS, Etc.**

**WHEN ASPIRIN FAILS TO DO SO.**

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PROMPT IN ACTION**

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Please write to HOWARDS' REPRESENTATIVE

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PARAFFIN ELIMINATING THE DISADVANTAGES  
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EFFICACY OF THE TREATMENT

OF PROVED VALUE IN  
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**Haemorrhoids,**  
**Malnutrition,**

AND ASSOCIATED CONDITIONS

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**INFANTS, CHILDREN AND INVALIDS**  
CONTAINING 50 PER CENT OF PURE LIQUID PARAFFIN OF HIGHEST  
VISCOSITY AND PRESENTED IN DRY FORM

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BRAND  
MALT EXTRACT WITH PARAFFIN  
*Lubricant-Nutrient-Digestive*

EXTREMELY PLEASANT TO TASTE IT MIXES FREELY WITH MILK OR WATER WITHOUT  
SEPARATION OF THE OIL. THE HIGHLY NUTRITIVE, DIGESTIVE AND MILK MODIFYING  
PROPERTIES OF THE WANDER MALT EXTRACT ARE RETAINED UNIMPAIRED THUS  
MAKING THE PREPARATION A VALUABLE ADDITION TO INFANT FEEDS

IT MIXES THOROUGHLY WITH THE INTESTINAL CONTENT PREVENTING FORMATION  
OF SCYBALA AND DOES NOT CAUSE OVER LUBRICATION

Rx 'Cristolax

**Manufactured by A. WANDER Ltd., London, England**

*A liberal supply for clinical trial sent free to medical men in private  
or hospital practice on application to the agent for India*

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15, Elphinstone Circle, Bombay,  
6/20, North Beach Road,  
Madras.**



# PHYLLOSAN

*A preparation possessing the testimony of a mass of responsible scientific and medical evidence which justifies its efficiency and therapeutic value.*

*Prepared under the directions and formula of*

***Prof. E. Buergi, M.D.***

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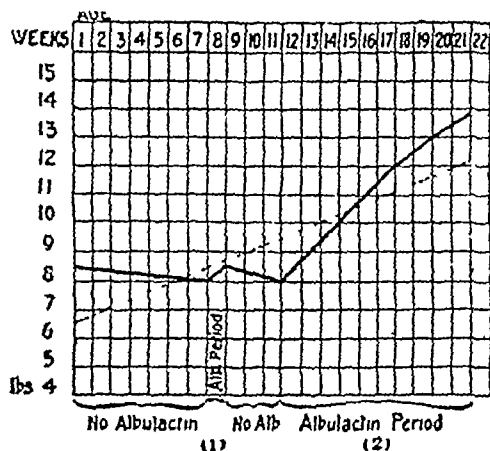


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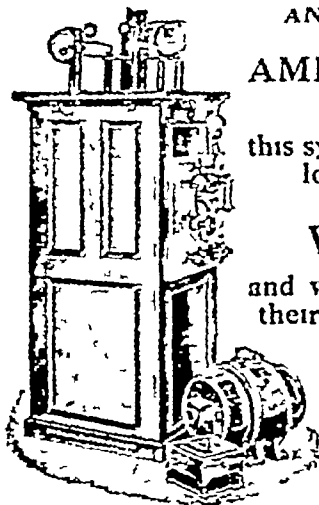
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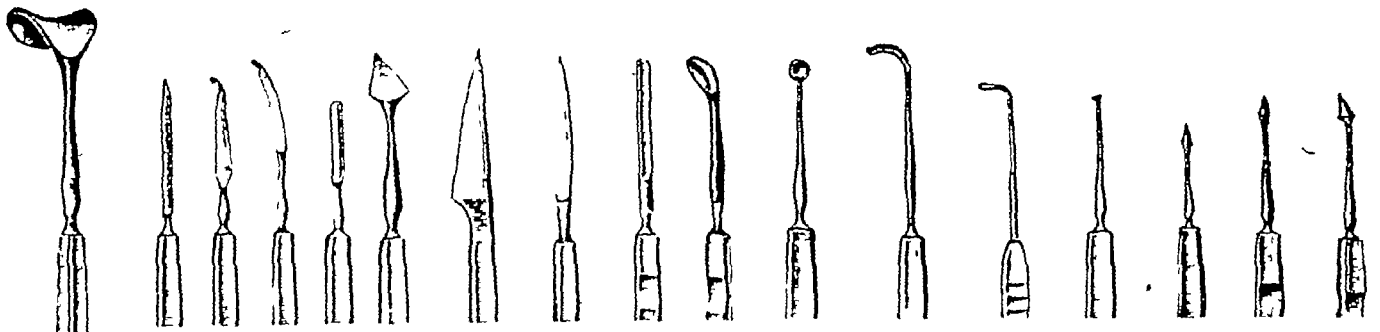
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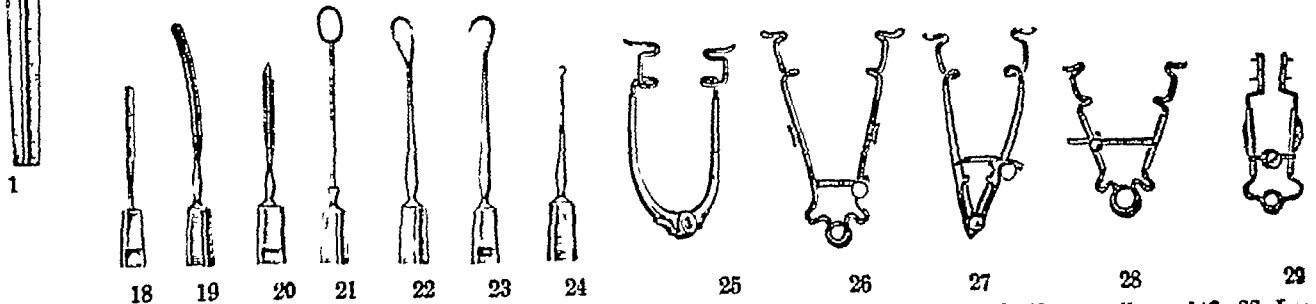
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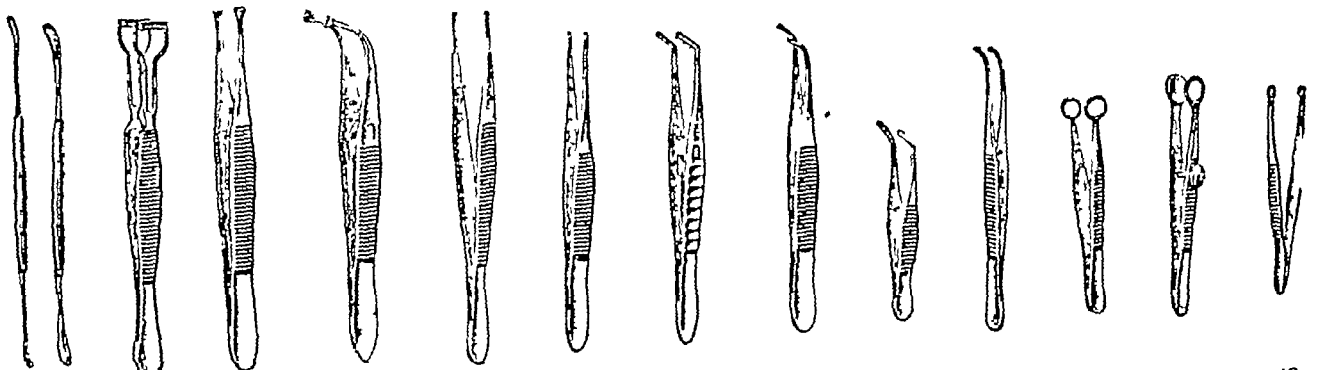
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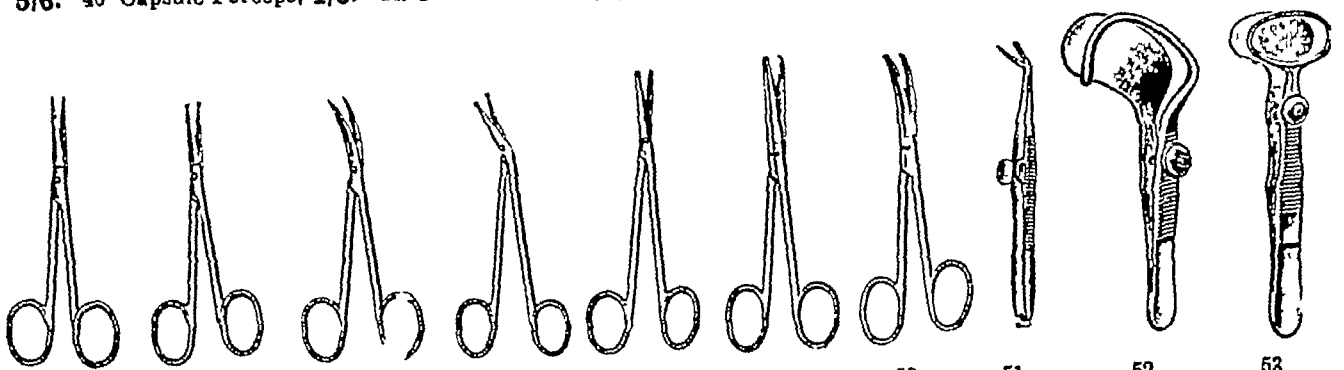
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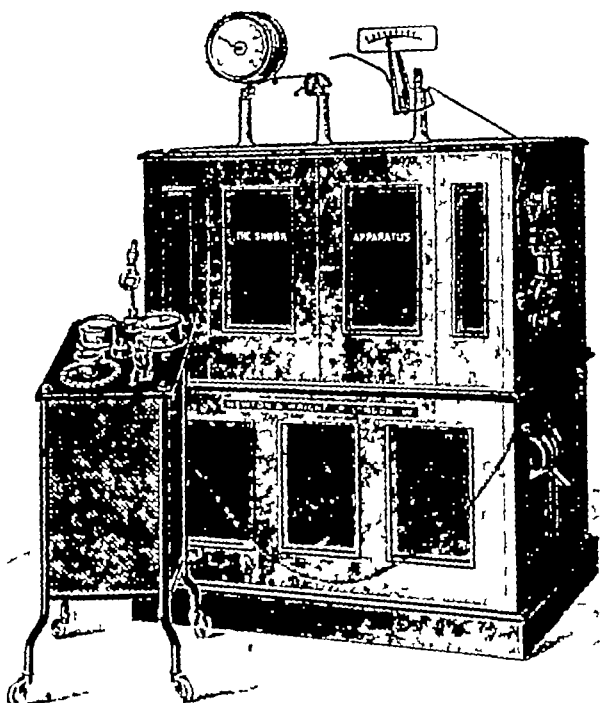
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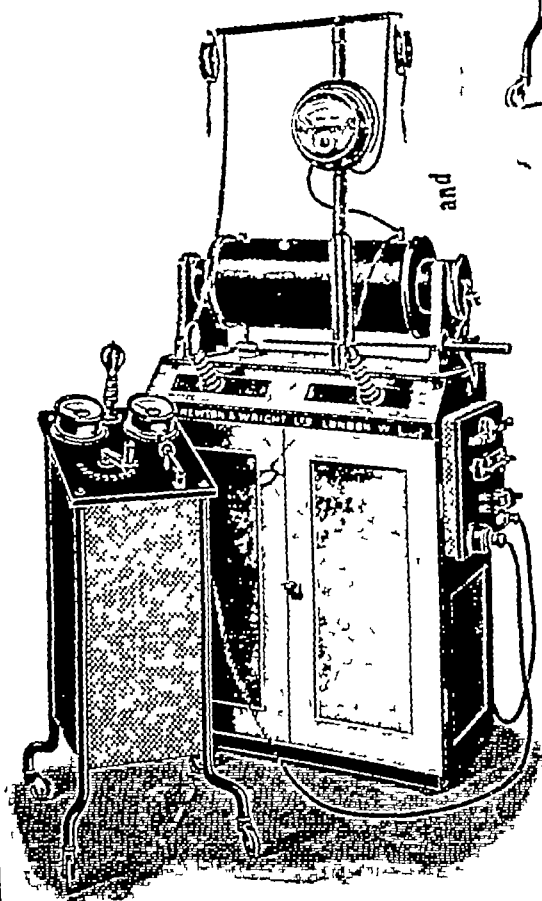


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